MONOGRAPH

OF THE

ORDER PHOLADACEA.

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1 *Vivipara Texana.*—*Tryon.*
2 *Diplothyra Smithii.*—*Tryon.*

3 *Rocellaria Stimpsonii.*—*Tryon.*
4 *Amnicola depressa.*—*Tryon.*

A

MONOGRAPH

OF THE

ORDER PHOLADACEA,

AND OTHER PAPERS.

BY GEORGE W. TRYON, JR.,

MEMBER OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA,
CORRESPONDING MEMBER OF THE CALIFORNIA ACADEMY OF
NATURAL SCIENCES, SAN FRANCISCO, CALIFORNIA.

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TO

WILLIAM M. GABB, A. M.

PALÆONTOLOGIST TO THE STATE OF CALIFORNIA.

MEMBER OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA,
THE BOSTON SOCIETY OF NATURAL HISTORY,
THE CHICAGO ACADEMY, THE NEW YORK LYCEUM OF NATURAL HISTORY,
THE ST. LOUIS ACADEMY OF SCIENCE, THE CALIFORNIA
ACADEMY OF NATURAL SCIENCES,
SAN FRANCISCO, ETC. ETC.,

This Little Volume

IS AFFECTIONATELY INSCRIBED AS A SOUVENIR OF

FRIENDSHIP, AND AS A TRIBUTE OF RESPECT,

FOR HIS VALUABLE RESEARCHES IN

FOSSIL CONCHOLOGY.

CONTENTS.

From Proceedings of the Academy of Natural Sciences of Philadelphia, Dec. 1861

On the Mollusca of Harper's Ferry, Virginia.

BY GEORGE W. TRYON, JR.

In the month of June, 1859, I was called by business to Harper's Ferry, and while there, having a very brief period of leisure at my disposal, I employed it in making a collection of the shells of the vicinity. I was struck at the time with the exceeding abundance of these, both in individuals and species, and also by the prevalence of certain external characters, much more prominently marked, than in the same shells from the vicinity of Philadelphia. These peculiarities, on a recent re-inspection of the shells, have appeared to me worthy of mention; and the subject of geographical distribution may receive some new light from the publication of a list of the Mollusca of the mountainous region of Virginia. The species collected are as follows:

GASTEROPODA.

Melaniadæ.

These shells were numerous upon the rocks in the bed of the Potomac, just below the junction of the Shenandoah River, and at the U. S. Rifle Armory on the latter stream.

Melania Virginica, *Gmelin*, sp.—The whorls well rounded, and entire to the apex. Frequently smooth, but the carinated varieties more abundant; (*M. multilineata* Say); on these, the carinæ, varying from three or four to eighteen on the body whorl, are raised and sharp, and on the more crowded ones, the interstices are densely striated by the longitudinal lines of growth. All the specimens are distinctly banded with brown. Length reaching 1·5 inches.

Leptoxis isogona, *Say*. Three specimens found.

L. dentata, *Couthouy*. Very numerous. Epidermis generally a rather brilliant green. Transverse brown bands, two near the base, and one near the suture.

L. nigrescens, *Conrad*. Numerous. Inhabiting with *L. dentata*.

L. carinata, *De Kay*. Very abundant. The carina is prominent and sharp, giving the shell a trochiform appearance. Color light horn, with faint revolving brown bands.

Rissoidæ.

Amnicola limosa, *Say*. Exceedingly abundant.

Viviparidæ.

Vivipara decisa, *Say*. Rare. Epidermis distinctly striate, with impressed spiral lines.

Valvatidæ.

Valvata tricarinata, *Say*. Very numerous, but not so much so as the variety *bicarinata*, Lea. A few specimens of the smooth variety *simplex* were gathered. None of the individuals collected had attained more than one-eighth inch diameter.

Helicidæ.

The towering wooded hills on the south side of the Potomac and Shenandoah, are thickly inhabited by Pulmonates. Every projecting rock which arrests the downward course of the mountain torrents, has gathered around

its base numbers of dead shells, which are found in all stages of preservation. In some places, where well protected, these shells actually lay in heaps. In a decayed log by the water side, nearly one hundred specimens of Helix and Pupa were obtained. A close search on the hills on the north side of the Potomac failed to discover a single species of Helix or Pupa.

Helix albolabris, *Say*. Diameter 1·25 inch. Spire rather depressed, and aperture sub-triangular. Reflected lip very broad and flat, with a tendency to form a tooth-like lamina near the umbilical region. Striæ coarse and crowded.

H. thyroides, *Say*. A few specimens obtained.

H. monodon, *Rackett*. This species appears to be rare at Harper's Ferry. I found but one individual.

H. hirsuta, *Say*. Common. All that were collected are entirely destitute of the hairy epidermis. There is considerable difference in the convexity of the upper surface, the spire being sometimes rather depressed.

H. concava, *Say*. Dr. Binney, in his "Terrestrial Mollusks," states that the upper and lower extremities of the lip are united in this species by a thin callus on the columella. In the single specimen found by me, the callus is *very prominent*.

H. profunda, *Say*. Numerous. Attaining quite a large size, and with close, narrow, raised striæ. But one brown revolving band is visible.

H. pulchella, *Müller*. Rare.

H. tridentata, *Say*. In many of the specimens collected, the spire is scarcely at all elevated, and in one or two the upper surface is quite plane. Very common.

H. labyrinthica, *Say*.

H. chersina, *Say*. I discovered a very large number of *H. chersina* and *labyrinthica* in the old log previously alluded to.

H. lineata, *Say*.

H. arborea, *Say*.

H. indentata, *Say*.

Pupa armifera, *Say*. Exceedingly abundant.

P. contracta, *Say*. Three specimens obtained.

Bulimus marginatus, *Say*. Very numerous. The reflected lip is larger in proportion than in Philadelphia specimens.

No specimens of Succinea were obtained.

LIMNÆIDÆ.

Limnæa decidiosa, *Say*. I found some hundreds of this species on the rocks at the junction of the Potomac and Shenandoah Rivers.

L. columella, *Say*. Rather abundant. Specimens small size.

L. catascopium, *Say*. Rare. Three or four obtained.

Physa heterostropha, *Say*. One specimen.

Planorbis lentus, *Say*. One specimen found.

P. trivolvis, *Say*. Numerous, but not attaining a large size.

P. bicarinatus, *Say*. Very abundant; much more so than the preceding species. The carinæ, as in all the other fresh water mollusca from this locality, are very prominent and sharp.

P. parvus, *Say*. A few individuals were procured.

P. exacutus, *Say*. Rare. Five or six only were found.

Ancylus rivularis, *Say*. One specimen only, obtained from *V. decisa*, to the body whorl of which it was attached.

CONCHIFERA.

CYRENIDÆ.

Sphærium sulcatum, *Lam.* A very few specimens were found; the rocky bed of the river being probably unfavorable to the multiplication of bivalve shells. Those obtained possessed the same rugose epidermis which seems to distinguish all the shells from this locality.

UNIONIDÆ.

Unio cariosus, *Say.* This species attains a large size in the Potomac River; the individuals are not numerous, however, at Harper's Ferry. The paucity of the Unionidæ is remarkable in a region where the Gasteropoda, both terrestrial and fluviatile, are so abundant.

U. complanatus, *Solander*, (species.) Valves very thin and shallow, with the epidermis growing beyond their margins. The surface brilliant green in the young shell, and brown in the adult. Not one specimen in ten exhibits any green rays, even in young specimens.

U. Fisherianus, *Lea.* Several good specimens taken.

U. nasutus, *Say.* This species, like *U. complanatus*, very seldom exhibits a rayed surface.

U. ochraceus, *Say.* A single individual obtained.

U. radiatus, *Lam.* Beautiful specimens occur on the Potomac, with a light green polished epidermis, with broad dark rays, and frequently pencilled rays in the intermediate spaces.

Margaritana undulata, *Say.* (Sp.) Very rare. Nacre delicate pink, epidermis in adult shells jet black, much eroded at the beaks.

M. marginata, *Say.* (Sp.) I collected a number of specimens. They were all of small size. Epidermis in the young shells elegantly rayed.

Anodonta fluviatilis, *Dillwyn.* (Sp.) A few individuals were taken; their surface is almost a uniform dull brown, vastly inferior in beauty to those from the vicinity of Philadelphia.

A. implicata, *Say.* One specimen.

A. edentula, *Say.* One perfect young shell, and several larger odd valves were taken; they exhibit the same uniformity of color as *A. fluviatilis.*

The above shells were all collected within the space of two hours, such was their great abundance. A more prolonged search would doubtless add a few more species to the list, particularly among the smaller terrestrial shells. The Molluscous fauna of Harper's Ferry is distinguished for the development of heavy lines of growth and acute prominent carinæ on the shells of the species; and in the terrestrial shells, by the depression of the spire. It is strange that a climate which has evidently exercised some influence on the growth of the Mollusca, has still permitted a vast multiplication of individuals.

[From the American Journal of Science and Arts, Vol. XXXIII, March. 1862.]

A SKETCH

OF THE

HISTORY OF CONCHOLOGY IN THE UNITED STATES.*

The history of Conchology in America is necessarily brief—yet it is adorned with names which compare favorably with those of any of its cultivators in the old world. Indeed, wherever Conchology is studied, the works of Say, Lea, Conrad, the Binneys, Adams, Gould, and numerous other of our authors, are referred to as standard authorities. With so much perseverance and skill have our Conchologists worked up certain genera of shells, that almost all new species in those genera, are placed in their hands for determination and description.

In the earlier years of our scientific history there were almost no libraries, authentically named specimens, or well informed naturalists in America; hence the student was compelled to rely entirely upon himself; and his descriptions, published necessarily in an obscure manner, were inaccessible to, or generally neglected, or entirely unnoticed by Europeans, who continually redescribed the same species under different names, without regard to the prior claims of American authors, and frequently without the slightest attempt to study out their writings.† It was during these years of neglect that the science of Conchology was first cultivated in this country. Its votaries were men whose whole hearts were in their work, and they were continually urged by a noble ambition to new discoveries and achievements.

It must be acknowledged that notwithstanding adverse circumstances, the field was inviting to our naturalists; they were working in a new world, a vast continent whose varied and prolific natural objects, scattered as they were, over the broad expanse, from the ice-bound confines of the polar sea to the tropical regions of South America, had rarely or never met the eyes of civilized man. The abundance of material to be worked up,

* List of American writers on Recent Conchology. With the Titles of their Memoirs and dates of publication. By George W. Tryon, Jr., Member of the Academy of Natural Sciences of Philadelphia. 8vo. 68 pp. Baillière; New York, London, Paris and Madrid. 1861.

† See the chapter "*Of the ignorance and neglect of American Labors in Zoology, exhibited by European Naturalists.*" Binney's Terrestrial Mollusks, i, p. 56.

must in itself have proved a great inducement to commence the study of Conchology; in which even at the present time, there is vastly more yet to be elucidated in the United States than in Europe.

C. A. Le Sueur, a native of France, who resided for some years in Philadelphia, where he published numerous papers on Ichthyology and other branches of Natural Science, is the author of the first article on Mollusca published in America. Mr. Le Sueur's paper, which was printed in the first number of the Journal of the Academy of Natural Sciences of Philadelphia (May, 1817), is entitled "Description of six new species of Firola, observed in the Mediterranean Sea by Messrs. Le Sueur and Péron in the months of March and April, 1809." It is illustrated. Mr. Le Sueur followed this at short intervals, with descriptions of various new species of Cephalopoda and Pteropoda, all in the same Journal.

Thomas Say. In the same number of the Journal of the Academy which contains Le Sueur's first paper, and of equal date with it, is the first conchological paper by Say, the greatest of our earlier naturalists—a man who, without the advantage of a liberal education or the means which have since been brought into the study of natural history, made for himself an undying reputation in almost every branch. With a quick eye for distinguishing differences, and a remarkably sound judgment of their proper values, most of his descriptions are models of accuracy combined with brevity. Very few of his species have been set aside. Mr. Say had also the merit of appending to most of his descriptions of species, their prominent distinctive characters from nearly allied forms—a very important part of a natural history description, too generally neglected. Mr. Say's principal writings on Conchology consist of—

1. Ten articles in the Journal of the Academy of Nat. Sciences, vols. i, ii, iv, and v, (1817–1826) describing a very large proportion of the marine shells of our Atlantic coast, a majority of the Helices of the Middle States, together with many from the South and West, and many fresh water species.

2. Article "Conchology" in Nicholson's Encyclopedia, American editions. Published also separately, with the title "Descriptions of the land and fresh water shells of the United States." Philadelphia, 1818.

3. Numerous descriptions of terrestrial and fluviatile shells in the "Disseminator," a weekly paper published at New Harmony, Ind., (1829–1831). These were subsequently issued in pamphlet. New Harmony, Ind. pp. 26. 1841.

4. A short paper in the Transylvania Journal of Medicine. Lexington, Ky., 1832, (included in the last named pamphlet).

5. An Appendix to the Narrative of Long's Expedition to Lake Winnepeg, containing descriptions of Mollusca, &c.; published in 1824.

6. American Conchology; or "Descriptions of the Shells of North America." Issued in 6 numbers, 8vo, with sixty colored plates. New Harmony, Ind., 1830–4. A 7th (posthumous) number has been published by Mrs. Say.

The "American Conchology" contains a large number of our common Mollusca, of which very many are either nowhere else figured, or only in expensive monographs. The descriptions are very full and accurate, and the plates characteristic, though not well finished.

In the above publications Mr. Say has introduced one hundred marine, one hundred fluviatile, and seventy-five terrestrial species. A large number of types of these, labelled by the author, are preserved in the Collection of the Academy of Nat. Sciences at Philadelphia.

The demand for the "American Conchology," and other papers long out of print, had become so great, as to induce, in 1858, their republication, with colored plates, as the "Complete writings of Thomas Say, on the Conchology of the United States." This work is ably edited by Wm. G. Binney, who has revised the nomenclature of the genera and species, and added many valuable notes.

C. S. Rafinesque, added to his other attainments in Natural Science, a considerable knowledge of Conchology; and he pursued its study with great ardor after his arrival in this country. Unfortunately, his earlier descriptions are too short and indefinite, and nearly all of his figures are too rude, for satisfactory recognition; later, his love of fame and insatiable speciesmongry induced him to mingle these with descriptions of objects which never existed; and finally, we are compelled to believe, that he put full confidence himself in the existence of these imaginary objects, as the dark cloud settled on his mind, which made him in fact a mad naturalist. During this period Rafinesque frequently redescribed his own species under different names, and ignored entirely the works of other American naturalists, appropriating their species with an audacity which can only be excused by charitably conceding his mental aberration.

Under these perplexing circumstances, most of our Conchologists, after vainly endeavoring to identify his descriptions, have discarded them almost entirely. The following are Mr. Rafinesque's principal publications, referring to our Mollusca:

"Discoveries in Natural History made during a Journey through the Western Region of the United States." Published in the American Monthly Magazine and Critical Review, vols. iii and iv. New York, 1818–19.

"Prodrome de 70 nouveaux Genres d'Animaux d'Amerique, durant l'Annèe, 1818." In the *Journal de Physique*, Paris, Juin, 1819.

"Monographie des Coquilles Bivalves Fluviatiles de la Rivière Ohio, contenant douze Genres et soixante huit Espèces." In *Annales Générales des Sc. Physiques*, Tome iii. Bruxelles, Sept. 1820.

C. A. POULSON, of Philadelphia, in 1832, translated this last paper of Rafinesque's and published it in a small volume entitled:

"Monograph of the bivalve fluviatile Shells of the River Ohio."

D. H. BARNES was the next American writer on Shells. He published in this Journal ([1], vi, No. 1, 1823,) an important paper "On the genera Unio and Alasmodonta, with introductory remarks." This article, which contains descriptions of several supposed new species, bears evidence of considerable knowledge of the Naiades. Some of his species were, however, anticipated by Lamarck, who became early acquainted with a number of our Uniones.

In vol. xiii, of this Journal, Mr. Barnes made a reclamation of his species of Naiades. He also contributed a paper describing five new species of Chiton in vol. vii, No. 1. 1824. Mr. Barnes was one of the earliest contributors to the "Annals" of the New York Lyceum of Natural History, of which Society he was an efficient member. He published three papers in the first and second volumes of the Annals, 1824–28. He was accidentally killed, Oct. 27, 1828.

Dr. JACOB GREEN (deceased) was one of the earliest workers in this department of Natural Science. The following papers by Dr. Green are in the Contributions to the Maclurian Lyceum:

1. "Description of Helix Pennsylvanicus." *Note* to a Memoir on Salamander, p. 8. Read Oct. 23, 1826.
2. "Some Remarks on the Unios of the United States." Read April 23, 1827.
3. "Description of two new species of Achatina from the Sandwich Islands." Read May 14, 1827.
4. "Remarks on Achatina Stewartii." Read Sept. 27, 1828.

His papers in the Transactions of the Albany Institute consist of—

1. "Monograph of the Cones of North America, including three new species."
2. "The Dolia of the United States," and
3. "Notes on American Shells figured in the Supplement to the Index Testaceologicus." All read June 7, 1830.

He also contributed papers at various times to Doughty's Cabinet of Natural History. Vols. i, ii, iii. Philadelphia, 1830–33.

Dr. S. P. HILDRETH, of Marietta, Ohio, a well known contributor in other departments to this Journal, published in the first series, vol. xiv, 1828, an interesting paper on the shells inhabiting the vicinity of that town.

Isaac Lea, President of the Academy of Natural Sciences, contributed his first paper on Conchology to the Philadelphia Philosophical Transactions, vol. iii, 1828; and from that date to the present time, a period of thirty-four years, he has given unceasing attention to the science, and particularly to his chosen speciality, the Naiades, with whose history he has become perfectly identified, having described five-sixths of all the recent species published.

There are but few authors who have so patiently, indefatigably and successfully, worked up the subject of their studies as Mr. Lea. He has contributed two hundred papers to the Proceedings of the Academy, and of the Philosophical Society, describing about 550 species of Naiades, 400 species of Melanians and other fresh water shells, and 50 species of Terrestrial shells.

These papers are elaborated in the Transactions of the Philosophical Society, and Journal of the Academy of Natural Sciences, 2d series, and are illustrated by excellent figures, many of them colored.

They have also been issued in *eight quarto volumes*, containing in all 850 pp. and 198 plates, as follows:

Vol.	I.	1832, pp. 230.	From Philos. Trans. III, IV, V.
"	II.	1838, pp. 152.	" " " VI.
"	III.	1842, pp. 88.	" " " VIII.
"	IV.	1845, pp. 75.	" " " IX, X.
"	V.	1852, pp. 62.	" " " X.
"	VI.	1858, pp. 96.	From Trans. Acad. Nat. Sci. III, IV.
"	VII.	1859, pp. 90.	" " " " IV.
"	VIII. (Part I.)	1860, pp. 56.	" " " " IV.

Mr. Lea has also published three editions of his "Synopsis of the Family of Naiades," a work containing a list of the species and their synonymy; the shells being grouped according to obvious external characters, in order to facilitate their determination. There is also a table of geographical distribution, and a very full index and bibliography of the subject; making the book an indispensable aid to those studying this interesting family of shells.

The third edition of the Synopsis was issued in 1852. (4to, pp. 88.) Since that time many new species of Naiades have been described, rendering a new edition necessary; and on this useful work, Mr. Lea is now engaged.

He has also attentively studied the Melanians of America, besides describing many exotic species for the Zoological Proceedings, London, 1850.

His last paper in the Proceedings of the Academy contains diagnoses of forty-nine new species of these shells, from Alabama. Mr. Lea is still actively engaged in his favorite pursuits,

and we may expect many able papers yet from his hands. We hope that he will find leisure to monograph the Naiades, with the same fulness of description and excellence of illustration, which distinguishes Binney's Terrestrial Mollusks. Such a work would be the crowning glory of a life nobly and usefully spent in the pursuit of science.

T. A. CONRAD, the eminent geologist, in the same year in which Mr. Lea printed his first article on the Naiades, gave to the world through the Journal of the Philadelphia Academy, (1st ser., vol. vi, p. 205: Aug. 1830,) an article on the Geology of Maryland, containing a list of recent shells of the coast of that State. This was followed, all through the first series of the same Journal by papers on recent and fossil mollusca. The most important of these is one containing "Descriptions of new Marine Shells from Upper California," vol. vii; 1837. This article gives descriptions and figures of eighty species. In the *second series* of that Journal are several papers, by this author, on marine and fluviatile mollusca. Several of them are beautifully illustrated. A noticeable article is the "Monograph of the genus Argonauta, with descriptions of five new species;" vol. ii, p. 331: 1854.

Mr. Conrad has also contributed to this Journal for a period of over twenty years, and to the Proceedings of the Academy of Natural Sciences. His most important paper in the Proceedings is an able "Synopsis of the Family of Naiades of North America." Unfortunately, the author, with a sincere desire to do justice to Rafinesque, has preferred the doubtful identification of many of his obscure species, to the well characterized descriptions of Lea and others; thus placing as synonyms specific names which will always stand good among the majority of Conchologists.

Mr. Conrad also did an unintentional injustice to Mr. Lea, by a want of care in affixing dates of publication to several species. The errors in these dates were however corrected by Mr. Lea, a short time afterwards, in the Proceedings of the Academy for the same year. On the other hand, the "Synopsis" establishes the priority of Mr. Conrad's description of several southern species of Naiades, over those of Mr. Lea. It is worthy of remark, that Say, Conrad, and Dr. Jay, each of whom retain a number of Rafinesque's names, and who by long study of this family should be considered competent to make a final determination of the validity of his species, have differed greatly in their conclusions. Messrs. Say and Conrad have several times changed their opinion of the species *intended* by Rafinesque's descriptions. Rafinesque deposited in the cabinet of his friend, C. A. Poulson, Esq., of Philadelphia, a collection of Naiades, and named them; but this was years after the publication of his papers, and meanwhile he had evidently forgotten many of the characters of his

own species; those who have worked most ardently in his cause, are therefore compelled to declare that they are unable to reconcile some of his descriptions with Mr. Poulson's shells bearing the same names.

Mr. Conrad has described the shells collected by Lieut. Lynch's Dead Sea Expedition, and he also edited Part 7th (posthumous) of Say's American Conchology.

We have purposely left till the last, in order to bring them together, Mr. Conrad's most important publications—three of the most useful volumes on Conchology issued in America. They are all out of print, and are highly valued by those fortunate enough to possess copies. They consist of—

1. "American Marine Conchology." Philadelphia, 1831. 17 colored plates. 8vo, pp. 72.

This volume contains descriptions and figures of many of our common coast shells. The species, however, are different from those contained in the "American Conchology" of Thomas Say.

2. "New fresh water shells of the United States, with colored illustrations, and a monograph of the genus Anculotus, *Say*. Also, a Synopsis of the North American Naiades." 16mo, pp. 76. Philad. 1834.

This little volume contains descriptions of many new species of Uniones and Melanians collected by the author, in the Alabama River, &c. The book is poorly printed and illustrated, but its contents are very valuable.

3. "Monograph of the Family Unionidæ, or Naiades of Lamarck, of North America." Issued in 12 8vo numbers, 1835–38, and illustrated by colored plates.

This is Mr. Conrad's most elaborate work. Its great value consists in its illustrations of our most common and best known species, but which are nowhere else figured in American publications. Mr. Conrad may be considered, next to Lea, the best informed of living men, on our Uniones. Although he early chose Geology as his life-time study, he has nevertheless made for himself a reputation in recent Conchology.

Mr. Conrad's descriptions, unfortunately, are generally quite too brief, and bear evidence in many instances of haste or carelessness in their composition; being sometimes so devoid of characters, that the species would be totally unrecognizable were it not for the accompanying plates.

Amos Binney. While Lea and Conrad worthily succeeded Say, in the investigation of the American Uniones, the late Dr. Amos Binney, of Boston, continued the labors of our first great zoologist among the Terrestrial Gasteropoda of this country. To the study of these interesting shells he devoted the leisure moments of his active life, for many years; and in his "Terres-

trial Mollusks of the United States," he has left us a noble monument of his love of the science.

Dr. Binney became early identified with the progress of Conchological science in America; he was one of the founders of the Boston Society of Natural History, and became its president. He traveled much, in the cause of science, and made large collections; and being a man of wealth, he employed much of his means in the accumulation of a library on Conchology, which, at the time of his death, was unequalled in America.

Dr. Binney was not only a student, but a passionate lover of nature, and his more elaborate papers show that he possessed a genuine love of his subject, which carried him much farther than the mere details of scientific description, into the investigation of the habits and mode of life of the Terrestrial Mollusca.

Dr. Binney's published papers consist of five articles in the Proceedings, and five in the Journal of the Boston Society of Nat. History. The most important of these is, "A monograph of the Helices inhabiting the United states." This elaborate and excellently illustrated paper appeared in several successive numbers of that Journal, and was afterwards expanded into a separate work, entitled "The Terrestrial air-breathing Mollusks of the United States," &c. This work occupied several years of its author's life, in its preparation, and dying before its completion, his will was found to contain liberal provisions for the continuation and publication of the work in expensive and magnificent style. At the request of the executors, Dr. A. A. Gould assumed and excellently fulfilled the task of arranging the material, completing the descriptions, and editing the work; which was soon completed so far as to permit the publication of the two volumes of text, in 1851; but so many delays occurred in the production of the magnificent plates, that the third volume did not appear until 1859. The large sum of ten thousand dollars was expended on the four hundred copies issued of this splendid work, which were *given away*, an offering for science; all the prominent Conchologists and scientific libraries here and in Europe receiving copies. They are the best epitaph of their lamented author, and will keep his memory green in the hearts of men, long after the storied marble shall have crumbled to the earth.

At Dr. Binney's death, his collection of Terrestrial Mollusks, and library, came into the possession of his son, W. G. Binney, who has happily inherited and well sustains his father's love for their study.

Joseph G. Totten, Gen. U. S. Top. Engineers, is one of the oldest cultivators of the science. Many years ago, he made himself acquainted with the marine Mollusca of the New England States, and was one of the first to dredge and describe new species from that region. He contributed two papers to this Journal, [1], xxvi and xxviii, 1834–5.

J. P. COUTHUOY, a Conchologist of considerable reputation, described a large number of our shells, principally marine, in the Boston Journal and in this Journal, 1838–9. He accompanied Wilkes' Exploring Expedition, as Conchologist, collecting large numbers of Molluscous animals and their shells. Many of the species contained in Dr. Gould's Mollusca of the Expedition, are described by him.

JOHN CLARKSON JAY, M.D., of Mamaroneck, Westchester Co., N. Y., has amassed a very large and valuable collection of shells; of which he has published several catalogues. The first edition was issued in 1835; second edition in 1836, with descriptions of new shells; third edition, 4to, 1839, with descriptions of new shells—illustrated with ten colored plates; fourth edition, 1850, 4to, containing 10,874 species, with a supplement (1852) containing 191 additional names.

These catalogues are arranged on the Lamarckian system. As all the synonyms are given besides the correct specific names, and references constantly made to figures and descriptions, this catalogue, (4th edit.) embracing as it does, so large a proportion of all the known species of shells, is invaluable as a work of reference, or as a guide to the formation of cabinets, and the exchange or cataloguing of specimens. The amount of labor on the last edition of this work must have been immense; the list extending to 480 pages and embracing 40,000 names, including synonyms; each accompanied by a reference to a figure and description. This could not be accomplished without years of preparatory study, and a familiar knowledge of all existing authorities on the subject.

Exception has been frequently taken to portions of Dr. Jay's Synonymy. To expect perfection throughout so extensive a subject, would be to look for impossibilities—but Dr. Jay has certainly a claim to be heard in this matter. With a magnificent collection of authentic specimens, embracing in many cases numerous varieties, and possessing, besides, a very complete library of works on Conchology, his deliberate conclusions certainly should have great weight among naturalists.

J. P. KIRTLAND, M.D., of Ohio, a zealous naturalist, has given considerable attention to the study of the Mollusca of his State. Various articles from his pen, relating to the Naiades, &c., are contained in this Journal for 1834, '37, '40.

Dr. Kirtland also gives a list of shells, in his Zoological Report of the State of Ohio. His latest publication on Conchology is a paper read before the American Association for the Advancement of Science, in 1851, and published in their Proceedings for that year. It is entitled, "Remarks on the sexes and habits of some of the acephalous Bivalve Mollusca."

CHARLES B. ADAMS (deceased 1851) was one of the most indefatigable and accurate of our Conchologists. His published papers, in thirteen years, amounted to about sixty, containing descriptions of 700 species of shells.

Of these articles, nine were printed in this Journal, six in the Boston Proceedings and Journal, four in the Proceedings of the American Association, and nine in the New York Lyceum Annals. The most important are—

"Descriptions of new species of shells." This Journal, [1], vol. xxxix, 1840.

"Catalogue of the Mollusca of Middlebury, Vt., and vicinity; with observations." This Journal, vol. xl, 1841.

"Description of twenty-five new species of New England shells." Bost. Proc., ii, 1844–5. This was written in conjunction with Dr. Mighels.

"Specierum Novarum Conchyliorum in Jamaica repertorum, Synopsis." Bost. Proc., ii, Jan. 1, 1845.

"Descriptions of new species of marine shells of New England." Bost. Journ., ii, 1840.

"On the nature and origin of the species of Testaceous Mollusca in the Island of Jamaica." Proc. American Assoc., iv, 1851.

Descriptions of a great number of Jamaica Shells, in the Lyceum Annals, 1850–1.

"Catalogue of shells collected at Panama." Annals Lyceum, 1852; also published separately in a thick 8vo volume.

"Mollusca," in Thompson's History of Vermont; also issued in a pamphlet, 20 pp.

Two small quarto tracts containing monographs of the genera Stoastoma and Vitrinella.

"Contributions to Conchology." 8vo, 258 pp. Issued in twelve numbers, from 1849 to 1852.

The study of the Mollusca of Jamaica occupied Prof. Adams' principal attention, and he was eminently successful in his researches among them.

Prof. Adams described numerous new species among the shells collected by him at Panama. The number of Jamaica shells that he has described is also very large—namely, 260 terrestrial, 20 fluviatile, and 200 marine species.

Prof. Adams also gave much attention to the habits and geographical distribution of these shells, and has illustrated the subject in several able papers. The large collections made by Prof. Adams at Panama and Jamaica, were properly named, and a full series placed in the Cabinet at Amherst College; the remainder were offered for sale by the trustees of the College, on whose account he visited those regions. A very large number of specimens were thus distributed among the lovers of the science in America and Europe, so that many private cabinets contain good collections of them.

The descriptions, of this author, are very minutely accurate, dwelling on every slight peculiarity of the shell before him; hence, a number of his species have proved to be merely well marked varieties, undue importance being attached to all their minor differences.

The writings of Prof. Adams are, however, very valuable, as they are distinguished by their marked ability, and fill up a gap in the history of American Mollusca; no other author having described any considerable number of the shells of Jamaica—an island which contains an almost isolated molluscous fauna—very few only of its species being common to the other islands.

Augustus A. Gould, M.D., of Boston, is one of our most voluminous writers on Conchology, his papers covering almost the entire range of the science.

His first publication was a translation of the generic descriptions by Lamarck, entitled, "Lamarck's Genera of Shells; with a catalogue of species." (Boston, 1833.) He has since that time had the good fortune to be connected with some of the most elaborate works on the subject, published in America.

Dr. Gould contributed several short papers to this Journal, in 1840 and 1848; and he has also a paper in the London Zoological Proceedings for 1857, "On the Nautilus umbilicatus of Lister." With these exceptions, the whole of his shorter papers have appeared in the Boston Journal and Proceedings. The Journal contains:—

"A monograph of the species of Pupa found in the United States."

"Descriptions of shells from the Gulf of California, and the Pacific Coasts of Mexico and California."

Also, articles describing shells from Burmah, Cuba, and Africa.

The contributions of Dr. Gould to the Boston Proceedings number over forty, and embrace descriptions of terrestrial, fluviatile and marine species from all parts of the United States, Burmah, Liberia, Sandwich Islands and Brazil; those of Wilkes' U. S. Exploring Expedition, and the North Pacific Exploring Expedition. Besides these, Dr. Gould's "Remarks" made before the Boston Society, and published in their Proceedings, embrace a running commentary on recent publications, criticisms of new species, details of the habits and anatomy of the Mollusca, and many other interesting subjects.

The paper "On the shells collected by Wilkes' U. S. Exploring Expedition," contains short descriptions of the hundreds of species which have since been published in complete and beautiful style, as a Government Report.

The plates of this Report have just been issued, their preparation having occupied several years. They are very carefully drawn and splendidly colored.

Dr. Gould has been lately engaged on the Mollusca of the North Pacific Expedition—short diagnoses of species appearing in the numbers of the Boston Proceedings, to be followed at some future time by the publication of an elaborate Government Report.

When the State of Massachusetts added a Zoological Department to their Geological Survey, to Dr. Gould fortunately was assigned the Invertebrata of the State, comprising the Mollusca, Annelida, and Radiata. The result of his investigations appeared in a thick octavo volume published in 1841. This work is distinguished for the critical accuracy of its descriptions, and has become a standard authority on our marine shells, of which it describes many new species. While it is the first work embodying the complete molluscous fauna of any portion of our country, it still remains the *best.*

Dr. Gould was chosen by the executors of the will of Dr. Amos Binney, to edit the work on the "Terrestrial Mollusks," which was left incomplete by the death of that author. This labor he performed with great skill and judgment. The illustrations were continued in the same magnificent style as they were commenced under the direction of Dr. Binney, and the literary contents are augmented by descriptions of many new species discovered prior to the publication of the third volume, at the commencement of which they are inserted. Dr. Gould has also contributed to the first volume, a valuable memoir of Dr. Binney. Dr. Gould is an accurate and critical observer and describer of natural objects. His pages exhibit to the eye the individuality of his subject with the same clear analytical precision with which it impressed his own mind. He has been very successful in his investigations, adding nearly one thousand species to the recent Mollusca.

JOHN G. ANTHONY, of Cincinnati, has for years devoted his attention to the study of the Melanians of the United States; and he has divided with Mr. Lea the honor of working up the many species of this interesting family.

Mr. Anthony's principal papers are, one in the Boston Proceedings, vol. iii, describing sixteen species of Melania, one in the New York Lyceum Annals, vol. vi, April 1854, describing fifty species collected by himself in the Southern States, and another in the Proceedings of the Philadelphia Academy, Feb. 1860, describing fifty-eight species.

S. S. HALDEMAN. Our fluviatile Gasteropoda, other than Melanian, are best known through Prof. Haldeman's "Monograph of the Limniades, and other fresh water univalve shells of North America," published in eight numbers—1840–44. The descriptions of species in this work are very full, and admirably illustrated by the colored plates.

Prof. Haldeman has published in Chenu's "Illustrations Conchyliogiques," a "Monographie du genre Leptoxis, Rafinesque; (Anculosa, Say.)" Folio, Paris, 1847, with beautiful plates. He has also contributed several papers to the scientific Journals, among which is an "Enumeration of the Recent Fresh-water Mollusca which are common to North America and Europe, with observations on species and their distribution," in the Boston Journal, iv, p. 468, 1844. This paper, together with the comparisons instituted by Prof. Adams with our marine species, and by Dr. Binney in the terrestrial shells, has furnished much valuable information in regard to the geographical range of species over parts of two continents.

HENRY C. LEA, son of Isaac Lea, has evinced considerable talent in the sciences of Conchology and Geology. He has a short paper in the first series of this Journal; and a more extensive one in the Boston Journal, entitled "Descriptions of some new species of marine shells inhabiting the coast of the United States." He also assisted his father in the determination and description of the exotic Melanians in the collection of Mr. Cuming.

CHARLES M. WHEATLEY, M.A., of Phœnixville, Pa., who has formed an excellent private collection of shells (now the property of Union College), published, in 1842, the first general "Catalogue of the Shells of the United States, with their localities."

New species of shells from Maine are described by Dr. J. W. Mighels, in the Bost. Journal, iv, p. 37, January 1842.

These Catalogues are very useful in stimulating research, and also afford much information regarding the geographical distribution of species.

The following Catalogues have been published:

Maine. By Dr. Mighels.
Vermont. By Prof. C. B. Adams.
Massachusetts. By A. A. Gould, Gen. J. G. Totten, Samuel Tufts, W. Prescott, J. M. Earle, Thomas A. Greene, J. L. Russell, Wm. Stimpson, and Jos. True.
Connecticut. By Rev. J. H. Linsley and Dr. A. A. Gould.
New York. By Dr. J. E. DeKay, Sanderson Smith, and Dr. James Lewis.
Pennsylvania. By Prof. S. S. Haldeman, Wm. Hartman, R. M. S. Jackson and Wm. M. Gabb.
Maryland and Virginia. By T. A. Conrad and Charles Girard.
North and South Carolina. By J. D. Kurtz and Lewis R. Gibbes.
Florida. By T. A. Conrad.
Mississippi. By B. L. C. Wailes.
Louisiana. By Geo. C. Shumard and C. B. Adams.
Tennessee. By Gerard Troost.
Ohio. By Jno. G. Anthony, Frank Higgins, S. P. Hildreth, and J. P. Kirtland.

Indiana. By J. T. Plummer.
Illinois. By Robert Kennicott.
Michigan. By Dr. Abraham Sager.
Wisconsin. By I. A. Lapham.
Washington Territory. By Wm. Cooper.

Lists of the Terrestrial, Fluviatile and Marine Shells of the United States have been drawn up by Messrs. W. G. Binney, Temple Prime, Isaac Lea, P. P. Carpenter and Wm. Stimpson, and published by the Smithsonian Institution.

JAMES E. DEKAY, M.D. The Zoological Department of the New York Geological Survey was committed to Dr. DeKay, (deceased,) who in 1843 published a voluminous Report in quarto, on the Mollusca and Crustacea. The Mollusca comprise 277 pages with forty colored plates. This work has been carelessly compiled, and many of the species are almost unrecognizable from the descriptions. A number of new species are proposed, which would never have been brought forward, if Dr. DeKay had made himself as thoroughly acquainted with his subject as he should have done, before undertaking a work of such magnitude. Still, despite its numerous faults, this volume is necessarily an important addition to conchological literature. In nearly every genus, short descriptions of the extra-limital species are given, so that over six hundred species of American shells are contained in it. The plates are roughly executed, and poorly colored.

WYMAN and LEIDY. Our knowledge of the anatomy of our terrestrial Mollusca is due almost entirely to the labors of Drs. Jeffries Wyman and Joseph Leidy.

The former has published in the fourth volume of the Boston Journal, papers "On the Anatomy of *Tebennophorus Caroliniensis*," and "On the Anatomical Structure of *Glandina truncata*, of Say."

Dr. Leidy, of Philadelphia, has carefully investigated the anatomical structure of our Terrestrial Gasteropoda, and has published the results of his labors in the first volume of Binney's Mollusks and in pamphlet. This paper, the preparation of which must have cost immense study, is illustrated by some of the finest anatomical plates ever published in America.

For the last ten years Dr. Leidy has occasionally described new forms of American Marine and Fluviatile Polyzoa, (Bryozoa), and we understand that he is preparing a monograph of our fluviatile species.

LOUIS AGASSIZ has given some attention to the anatomy and embryology of our Mollusca. He has several short papers in the Boston Proceedings, 3d vol., and an important article on the Embryology of Ascidia in the second volume of Proceedings of the American Association for the Advancement of Science.

It is understood that a coming volume of Agassiz's "Contributions" will contain an elaborate account of the embryological

development and anatomy of the animals of the North American Naiades.

JOHN H. REDFIELD, late of New York, now of Philadelphia, has published in the Annals of the Lyceum, several papers on marine and terrestrial shells. Among them are descriptions of several new species of Marginella—of which genus Mr. Redfield has made an especial study.

WILLIAM STIMPSON, M.D., has become a familiar name to Conchologists from his extensive study of our Atlantic coast shells. He has, probably a profounder practical knowledge of our marine molluscous fauna, and their bathymetrical and geographical distribution than any other naturalist. Dr. Stimpson's principal work is entitled "Shells of New England—a revision of the Synonymy of the testaceous Mollusks of New England." 8vo. Boston, 1851. This work is intended to be a companion to Gould's Invertebrata of Massachusetts—the nomenclature of which is corrected in accordance with the present arrangement of the mollusca.

Dr. Stimpson has contributed several interesting papers to the Boston and Philadelphia Proceedings and to this Journal. The extensive dredging operations conducted by this naturalist are deserving of much praise: numerous portions of our coast have been explored by him; and recently while accompanying the North Pacific Exploring Expedition, as zoologist, he obtained in this way an exceedingly rich collection of marine shells from the Japanese and Arctic seas. These are now being described by Dr. Gould, in the Boston Proceedings.

TEMPLE PRIME, of New York, is our great authority on the family of Cyclades, having confined his attention almost entirely to them. Besides descriptions of new species, Mr. Prime has done much good service in working up the synonymy of the several genera whose history he has investigated.

He has published the following papers:

"Descriptions of new species of Cyrena and Corbicula," and "Synonymy of the Cyclades," in Proceedings of the Academy Nat. Sciences; "Descriptions of new species of Cyclas and Pisidium," a "Synonymy of Pisidium," and "Descriptions of two new species of the genus Batissa, with notes on that genus," in Annals N. Y. Lyceum.

Several descriptive papers and Synonymy of Cyrenella and Rangia, in the Boston Proceedings; "Monograph of the species of Pisidium found in the United States of North America," illustrated, in Boston Journal; and "Descriptions of new shells (Cyclades) from the collection of Hugh Cuming, Esq.," in the London Zoological Proceedings.

In these papers, Mr. Prime has increased the number of known species of Cyclades nearly one-half.

THOMAS BLAND, of New York, first became known to Conchologists as an efficient co-laborer with Prof. Adams, in the West

Indian Terrestrial Mollusca. He contributed several papers to the "Contributions to Conchology," cataloguing the species of St. Thomas, W. I., and New Granada. He has also an article in this Journal, Nov. 1852, entitled, "Facts and principles relating to the origin and Geographical Distribution of Mollusca."

Mr. Bland's most important papers are the "Remarks on certain species of North American Helicidæ, with descriptions of new species," of which two parts have appeared in the 6th and 7th volumes of the Lyceum Annals. The third part is now ready for publication. These papers form a valuable addition to our critical knowledge of the Helices of the United States. Mr. Bland has also just issued a paper (see p. 158, this vol.) on the Geographical distribution of the Genera and Species of Land Shells of the West Indies, which gives many curious and important facts in reference to the range of species. Mr. Bland is thoroughly familiar with these shells, and is perhaps better fitted to pursue this important line of investigation than any other conchologist.

Wesley Newcomb, M.D., formerly of Troy, N. Y., now of Oakland, California, during a residence at the Sandwich Islands, for many years, studied the beautiful terrestrial genus Achatinella. He has described a large number of species in the New York Lyceum Annals, the Boston Proceedings, and the London Zoological Proceedings. His papers in the latter are illustrated with fine colored plates.

The Achatinellæ have also been studied and described by Dr. Mighels, Prof. Adams, Dr. Gould, and Mr. Gulick.

The genus Argonauta has been studied by Dr. J. C. Parkinson, who has added two new species.—Bost. Proceed., Sept. 1856.

William A. Haines, of New York, the possessor of one of the finest private conchological collections in the world, has a paper in the New York Annals, vol. vi, Oct. 1855, describing several new species of terrestrial shells from Siam.

James Lewis, M.D., of Mohawk, N. Y., has industriously studied the Mollusks of that vicinity, making many valuable additions to our knowledge of the habits and mode of growth of many of the fluviatile species. His numerous brief papers are contained in the Boston and Philadelphia Proceedings.

J. B. Trask, M.D. The only papers on Conchology published as yet west of the Rocky Mountains, are two by Dr. Trask, describing new species of Naiades of California, published in the Proceedings of the California Academy of Nat. Sciences, vol. i, 1855; and Descriptions of Terrestrial and Fluviatile Shells, by Dr. Newcomb, in the Proceedings of the same Society for 1859 and 1860.

William G. Binney, of Burlington, N. J., has continued the investigation of the Terrestrial Shells, commenced by his father. He published in 1859, in the Boston Journal of Natural History,

and also separately, a "Supplement to the Terrestrial Mollusks," forming vol. iv of that work in 8vo, pp. 207, with six colored plates. This volume, which exhibits great ability and an intimate knowledge of his subject, placed its author at once in the foremost rank of American conchologists. It not only describes all the more recent species, but also includes a thorough revision of those contained in his father's work, giving additional synonymy and localities.

Mr. Binney has published a number of papers in the Proceedings of the Academy of Natural Sciences, 1857–61, under the general title of "Notes on American Land Shells." These papers contain descriptions of many new species, and a complete synonymy of our Helices. He has prepared for the Smithsonian Institution lists of the Terrestrial and Fluviatile Gasteropoda of North America. He also edited, recently, in an able manner, a new and splendid edition of the conchological writings of Say. See ante, page 163.

Mr. Binney is at present engaged in an extensive work for the Smithsonian Institution. He is preparing for them descriptions of our Terrestrial and Fluviatile Gasteropoda, for cheap publication and free distribution. He has also just completed a work on the Synonymy of American Shells, forming a very large paper—the MSS. extending to several hundred pages.

The publication of these works will mark a new era in the progress of Conchology among us, as it is believed that their distribution will very much enlarge the number of students of the science; the scarcity and high cost of works of reference having hitherto proved a discouraging barrier to persons of limited means. Now, however, the Smithsonian Institution intends providing the proper works of reference, free of cost.

Mr. Binney is very methodical in his writings—which, without any pretension, reveal the utmost deliberation and profound study on the part of the author. He possesses a nice discrimination of specific values, and is exceedingly well informed in the general history and bibliography of the science.

PHILIP P. CARPENTER, of Warrington, England, well known by his comprehensive Report to the British Association, on our West Coast Mollusca, prepared a list of those shells for the Smithsonian Institution. It has also published, recently, a volume of "Lectures on Mollusca," by this gentleman.

A. D. BROWN, of Princeton, N. J., has just published in the Proceedings of the Academy of Nat. Sciences, descriptions of new species of Helix. Mr. Brown is a close student of the Terrestrial Mollusca, and will doubtless become one of our leading conchologists.

We have thus noticed the principal writers on shells, in America, to the present time. We must regret that want of space has

compelled the omission of much that would be of interest to the reader, who is referred, for a more complete list of Authors and their Papers, together with accurate dates of publication, to the work at the head of this article, which has furnished us with most of the material for the foregoing pages.

It will be seen that our several scientific Journals have contained a very large number of papers by our best authors—thus, the publications of the Boston Society have those of Adams, A. Binney, Couthuoy, Gould, Prime, &c. The New York Annals those of Adams, Anthony, Bland, Newcomb, Prime and Redfield. The Journal and Proceedings of the Philadelphia Academy have the valuable papers of Say, Conrad, Anthony, Lea, W. G. Binney, Leidy, Prime, Stimpson, &c. The Philosophical Transactions contain many of Lea's extensive articles; while papers by many of these authors have also appeared in this Journal.

There are many fine public and private collections of shells in the United States. That of the Academy of Natural Sciences embraces about eleven thousand species. In the arrangement of the Academy's Cabinet, Pfeiffer's system is followed for the terrestrial species, while with the fluviatile and marine shells, the Lamarckian system is generally adhered to, with the introduction, however, of many of the more recent genera.

The splendid collection belonging to Amherst College is a noble monument of the unflagging assiduity and scientific attainments of the late Prof. C. B. Adams, who formed it. It embraces types of all his species and full suites of the shells of the various West India islands, and of Panama. It is esteemed by competent judges the most valuable collection for study in the United States.

The Boston Society of Natural History, the New York Lyceum, the Mercantile Library Co. of Cincinnati, Union College, Schenectady, N. Y. (formerly collection of C. M. Wheatley, of Phœnixville, Pa.), the Agassiz Museum and the Smithsonian Institution, each possess valuable collections.

The largest private collection in this country is that of Dr. John Clarkson Jay, of Mamaroneck, N. Y., numbering 13,460 species and numerous varieties. They are arranged according to the Lamarckian system. We have already alluded (p. 169) to his extensive and useful catalogues of his collection.

Wm. S. Haines of New York possesses twelve thousand species of shells, including many rare and unique ones.

Mr. Binney has a small but exceedingly valuable collection of the terrestrial shells of the United States, including many types of species, and also geographical series. The same may be said of the cabinet of Mr. Bland of New York.

Mr. Lea's cabinet of Unionidæ is unequalled in the world. It includes many thousands of carefully selected specimens from all parts of the world, exhibiting all the variations from specific types so common in this family.

Dr. Gould possesses a valuable collection, containing many types of species.

The most valuable cabinet of West India terrestrial shells is that of Mr. A. D. Brown, of Princeton, N. J., formerly the property of Thomas Bland. Mr. Bland's extensive correspondence in the West Indies, and especially with Prof. Poey, Dr. Gundlach, M. Sallé, R. J. Shuttleworth, &c., his own collections in St. Thomas, Jamaica and Bermuda, and his intimate relations with the late Prof. C. B. Adams, gave him extraordinary advantages and opportunities. Mr. Brown also has a large number of species of terrestrial mollusca from other countries—the whole amounting to three thousand species.

John G. Anthony of Cincinnati has a fine collection of American freshwater shells, principally Melanians, collected by himself.

The finest cabinet of operculated land shells is that of Mr. J. H. Redfield, late of New York, now of Philadelphia; he has also a large collection of Marginellidæ, which he has made his especial study.

The collections of Temple Prime and Wm. Stimpson are exceedingly rich in their respective specialities, the Cyclades, and American marine mollusca.

Dr. E. Ravenel, of Charleston, S. C., an experienced conchologist, and one who has done much to further the study among us, possesses a valuable cabinet, rich in marine and other species, determined by Thomas Say.

There are numerous private collections in this country containing from one to five thousand species; among these may be mentioned those of Hon. E. Cowan of Pennsylvania, U. S. Senator; Theodore Gill, containing three thousand species; Dr. E. R. Foreman of Washington, D. C., thirty-five hundred species; and R. L. Stewart of New York.

The cabinet of Geo. W. Tryon, Jr., of Philadelphia, embraces over four thousand species, and many varieties. It includes a large number of American Unionidæ and Melaniadæ, supplied by Isaac Lea, Mr. Binney, and numerous others: a good suite of American terrestrial shells from Mr. Binney, many West Indian land shells, including a number of Adams' Jamaica species, and of Pfeiffer's (author's examples), and a fine Cuban suite from Prof. Poey; a splendid collection of Achatinellæ from Dr. Newcomb, a series of European terrestrial shells (several hundred species) from Terver of Lyons, besides numerous American and foreign marine shells, including a suite of Carpenter's Mazatlan shells.

Mr. D. Jackson Steward of New York, has also an extensive cabinet. It embraces that of the late Mr. Lounsbury, and the interesting collections, especially of marine species, made for Mr. Steward in Trinidad, Barbadoes, &c., by Mr. Theodore Gill.

It would much transcend the limits of this article to enumerate the numerous excellent conchologists and collectors, who though writing but little or nothing themselves, have yet, by furnishing *materiel* to our authors, and by the distribution of specimens, much aided the progress of the science. Among these are men of high attainments, such as the late Dr. R. E. Griffiths, P. H. Nicklin, and John S. Phillips of Philadelphia, Dr. Lewis of Mohawk, N. Y., Mr. Theodore Gill, Dr. E. R. Showalter, Uniontown, Ala., Bishop Elliot, of Georgia, Edmund Ravenel and Lewis R. Gibbes of Charleston, S. C., Thomas Nuttall, &c. The works of Messrs. Lea, Binney, Conrad, Stimpson, and others, contain many acknowledgments of specimens sent and information rendered by these and numerous other persons in all parts of the Union.

The present condition and prospects of conchological science in America are very encouraging, and its pursuit offers a fine field for the investigation of our young naturalists. The largest part of this continent is still unexplored for Mollusca, and rich discoveries will continue for years to reward the labor of investigators.

It may be asked—what benefit to mankind has resulted from the pursuit of this science? We might perhaps answer, that its great merit consists in affording an innocent recreation to the mind of man. But there is surely a nobler object to be gained by the study of conchology. God, who created man in His own image, has also placed around us a host of living things, each after its own kind, an exemplification of divine wisdom, in the admirable adaptation of means to ends, as shown in their organism and mode of life; and who shall say that it is profitless for man to examine these animals, endeavor to indicate among them groups approaching each other in various degrees of relationship, and to learn, as far as we may know it, the plan of the Creator in their formation. As God has not considered these animals unworthy His attention, surely they are worthy of our earnest study.

Besides this ethical view of our science we must not forget to what a wonderful degree Conchology has become the handmaid of Geology. Through every geological horizon, from the earliest dawn of life to the deposits now forming, the palæontologist is of necessity a conchologist. If certain organic forms merit the distinction of 'Medals of Creation'—Mollusca, from their abundance in all geological ages, may be called its current coin.

From Proceedings of the Academy of Natural Sciences of Philadelphia, Dec. 1861

Synopsis of the Recent Species of GASTROCHÆNIDÆ, a Family of Acephalous Mollusca.

BY GEORGE W. TRYON, JR.

Linnæus included in the genera *Serpula*, *Teredo* and *Pholas*, the curious group of shells which form the subject of this memoir; and it is not surprising that he should have made such a distribution when we recollect, that until quite recently the animals of these shells were unknown, whilst an obvious external resemblance existed between the tubes of Gastrochæna, Rocellaria, etc., and those of *Serpula* and *Teredo*, and the valves exhibited a close affinity to those of Pholas. The earlier conchologists, misled by these resemblances, in several instances referred to different genera the shell and tube of one species. Lamarck assigned to these shells their true position in the system. His family TUBICOLA included the various species of *Aspergillum*, *Clavagella*, *Fistulana* and *Gastrochæna*, together with *Teredo* and *Teredina*, and excluded the *Serpulæ*. TUBICOLA was placed in close connection with the family Pholadaria, to which it is nearly allied not only by external characters, but also by anatomical resemblances and circumstance of habitation. The Lamarckian arrangement and his genera, were adhered to by the few writers who have taken up the study of the family until within the past few years.

Dr. John Edward Gray, in a paper published in the London Zool. Proc. for 1858, entitled, "*On the Families Aspergillidæ, Gastrochænidæ and Humphreyiadæ*," proposed the following classification:—

Family I. *ASPERGILLIDÆ.*

Animal living sunk in sand, or holes in rocks, or shells; enclosed in a shelly tube in which it resides, and emitting from the front of its mantle a number of tentacles, which are enclosed in tubuli radiating from the edge or disk of the base of the enclosing tube.

Subfamily 1. PENICILLINA.

Both the valves of the adult animal imbedded in and forming part of the shelly tubular sheath. The valves of the young animals are early united into one plate.

Genera. *Warnea*, *Aspergillum*, *Penicillus*, *Clepsydra*, *Arytene*, *Fœgia.*

Subfamily 2. CLAVAGELLINA.

Only one valve of the adult animal imbedded in the shelly tubular sheath; the other free, and movable in the cavity of the tube.

Genera. *Clavagella* (fossil,) *Bryopa*, *Dacosta.*

Family II. *GASTROCHÆNIDÆ.*

Living sunk in sand or holes in rocks and shells; enclosed in a shelly tube, in which are contained the free, movable valves. The front of the mantle not provided with any tentacles. The tube of the adult animal closed at the base, and destitute of any slit or perforations; its siphonal end not expanded.

Subfamily 1. CHÆNAINA.

The tube symmetrical, clavate, free. The animal living free, sunk in sand.

Genus *Chæna.*

Subfamily 2. GASTROCHÆNAINA.

The tube irregular, attached. The animal living in holes in rocks, shells and other marine bodies.

Genus *Gastrochæna.*

Family III. *HUMPHREYIADÆ.*

The animal at first free and covered with two shelly valves, which become

united into a single plate, which expands on the sides and in front, forming a bag-like cavity, attached by its outer surface to shells or rocks, and, as the animal increases in size, it expands behind into a shelly tube with a circular aperture.

The front of the mantle is furnished with scattered tentacles, which are emitted through tubular pores on the upper part of the front of the tube, and round the circumference of the part by which it is attached.

The shells are attached to the surface of shells or rocks, and not sunk into their substance; nor do the animals live sunk in the sand like ASPERGILLIDÆ and GASTROCHÆNIDÆ.

Genus *Humphreyia.*

We have adopted several of the subfamilies and genera proposed by Dr. Gray, and have also used some of the genera as subgenera, but we do not consider the differences among these shells to be sufficient to warrant the creation of three families; nor are the genera so numerous as to require such a division for their proper study. The families proposed by Dr. Gray are not only discarded for the foregoing reasons, but also because their characters are very unequal in value. The *first*, comprising shells with both valves free, and those with but one valve free, the other attached, presents stronger differences within itself than those by which he has separated it from the *second* family; while the *third* (HUMPHREYIADÆ) is described as possessing a peculiar mode of growth, the tube being an enlargement or prolongation of the shelly valves. This may be true with regard to HUMPREYIADÆ, but then it is also true of the genus *Brechites*, the depressions round the valves evidently marking the growth of the tube from them, as a nucleus.

Mr. Lovell Reeve, in his "Monograph of Aspergillum," says, in relation to Humphreyia:—

"If the animal of this interesting form of Aspergillum could speak, its remarks on Dr. Gray's ingenious description of its structure, habits and shell would probably resemble those of our great landscape painter Turner, on the criticisms of his pictures by Ruskin,—'Ah! he sees a great deal more in them than I can, or ever intended should be seen.'

"The peculiarities of *Aspergillum* (*Humphreyia*) *Strangei* are, that it is an adherent species; and, secondly, that it forms its sheath in a square. Like the shell of all other adherent species of a genus, compared with those that live free, the shell of *A. Strangei* has a very distorted growth, and the part of the attachment being the most delicate part of the shell is the part most distorted. One of the only two specimens known has, on ceasing its free habit, commenced to attach itself within the hinge portion of a muscle; the other has been attached to stone, in a manner obviously even less commodious to the symmetry of its growth; and many of the points seized by Dr. Gray as points of generic character are contortions arising out of these peculiar circumstances of habitation. The disk is smashed in as it were, and the frill is pushed out at the edge of the place of attachment, and both are an irregular heap of contortion."

The three groups or subfamilies into which we have divided the recent GASTROCHÆNIDÆ, following the arrangement given by H. and A. Adams, form very natural divisions of equal value; and the first three genera, also, are founded on constant and very distinct characters; but the division of the old genus *Aspergillum* must be regarded as a purely artificial arrangement of a large number of species into groups, in order to facilitate their study, which, in a genus so subject to distortion and abnormal mode of growth, had become very perplexing. These genera will probably undergo much modification when we have a better knowledge of their animals, which at present are almost unknown to us.

Naturalists are not all agreed as to the application of Guettard's name

Brechites to *Aspergillum*. The description, it must be owned, is entirely inadequate; still, we have but little doubt that it was intended for this shell.

It is the aim of this paper to enumerate and define the various genera and species of GASTROCHÆNIDÆ, giving their synonymy in full, and also their distinctive characters. In the progress of the work, difficulties have been encountered that were scarcely imagined at the outset. The older writers have given us generally utterly inadequate descriptions, and have also in some cases confounded two or more species under one name and description,—e. g. in *Gastrochœna cuneiformis* and *Aspergillum Javanum*.

Then, again, many of the later species are founded on single or few specimens, and characterized principally by variations of surface and ornamentation, which *may* be found to be permanent when a larger number of specimens become known to us, but are most probably the result of accident, in a family acknowledged to be peculiarly subject to distortion from external causes. That a large number of these species could not be retained on present data, early became apparent; but the question with what forms they were to be united has sometimes proved a perplexing one. Where we have merged two or more species into one, our reasons are always stated; but they must be understood as mere opinions which future discoveries may very seriously modify.

Whilst the course we have thought proper to pursue may have resulted in the suppression of some good species, it offers us, in those which have been adopted as valid, objects distinguished from each other by well founded and permanent characters. Unusual care has been taken with the synonymy of the older species, the descriptions having been patiently studied out and compared, and it is probable that the most of them have been assigned to their true position; but for reasons already alluded to, there can be no certainty regarding this, and perhaps this paper should rather be regarded as a contribution of facts and authorities as *materiel* for the future monographist, than as an addition to positive knowledge.

It will be found by reference to the succeeding pages that we have placed in the synonymy of a number of genera and species many well known and generally received names. To explain our motive for so doing, we deem it important to enunciate the following general principle:

We hold that the oldest generic name, accompanied by a sufficiently accurate description for the purposes of identification, should always have priority; and the same rule applies to specific names; but in order to save naturalists from the labor of consulting the writings of the ancients and the danger of adopting a false application of their generally obscure descriptions, no pre-Linnæan names should be used.

The name of the naturalist who first describes a species of shell should forever remain attached to the specific name, of which, for all the purposes of memorizing or identification, it is properly a part; and should our better acquaintance with its structure and relations to other mollusca authorize its removal to another genus from that in which it was originally placed by its discoverer, then the latter's name should be followed by the word "Species," to indicate the fact.

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Argenville.. .....Conchyliologie, 1st edit. 1742; 2d edit. 1757.

Beau ....Catalogue des Coquilles du Guadaloupe. 1858.

Bellevue, Fleuriau de.....Journal de Physique, liv. 1802.

Blainville.....Manuel de Malacologie, 1825.

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Bonanni.....Recreatio Mentis et Oculi, 1684.
Born.....Testacea Musei Cæsarei Vindobonensis, 1780.
Bosc.....Histoire Naturelle des Coquilles, ii. 1824.
Bouchard-Chantreaux.....Moll. Boulonnais, 1829.
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Report on West Coast Mollusca, Brit. Assoc. for Advancement of Science, 1857.
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Chemnitz.....Conchylien Cabinet, vol. x. 1788.
Chenu, J. C.....Monographie du genre Aspergillum, Illust. Conch.
Collard de Cherres.....Cat. Test. Mar. du Dep't du Finisterre, 1830.
Crouch.....Introduction to Lamarck's Conchology, 1827.
Cuvier.....Regne Anim. edit. primo, ii. 1817.
" " Audouin's edit. Mollusques.
DaCosta.....British Conchology, 1778.
Della Chiaje.....Anim. Senza Vertebr.
Deshayes.....Mollusques, in Expl. Scientifique de l'Algerie. (Contains full and beautifully illustrated anatomical descriptions of the Animals of Rocellaria and Bryopa.
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Description of New Shells from the Collection of Hugh Cuming, Zool. Proc. Lond. 1854.
Dictionnaire des Vers. Encyc. Meth. ii. 1830.
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Gerville.....Catalogue des Coquilles de la Manche, 1825.
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Gray, J. E.....On the Structure of Humphreyia, Ann. and Mag. Nat. Hist. 3d ser. ii. p. 16, 1858.
On the Families of Aspergillidæ, Gastrochænidæ and Humphreyiadæ, Proc. Zool. Soc. London, part xxvi. p. 307, 1858.
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Klein.....Tentamen Ostracologicæ, 1753.
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Lamarck.....Animaux sans Vertebres, v. 1818.
" " " vi. 1835, (Deshayes' edit.)
Leach, W. E.....Mollusca of Great Britain, 1852.
Linnæus.....Systema Naturæ.
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Montagu.....Testacea Britannica, 1803.
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Rumphius.....Amboinsche Rariteitkamer, 1705.
Rüppell.....Reise, Nord Afric.
Savigny.....Mollusques, in Description de l'Egypte, 1826.
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Classification.

CONCHIFERA.

PHOLADACEA.

(Family I. *PHOLADIDÆ.*)

Family II. *GASTROCHÆNIDÆ.*

Shell.—Valves thin, gaping, edentulous, or teeth rudimentary, ligament external, adductor impressions two, pallial line sinuated; contained within a shelly tube, both valves free, or one or both valves cemented to its walls.

Animal.—Symmetrical, elongated, anteriorly truncated; with two long contractile siphons posteriorly, united nearly to their extremities, which are fringed with cirrated orifices. Margins of the mantle anteriorly thickened and united, with a small pedal opening; foot cylindrical, small; gills, a pair on either side, prolonged into the branchial siphon.

Frequently gregarious; burrowing in wood, stone, sand, or mud at low water mark, and lining their burrows with a calcareous tube; the shape of which, together with the more or less cohesion of the valves to its sides, affords the generic characters.

Subfamily 1. GASTROCHÆNINÆ, Tryon, (not Gray.*) 1861.

Shell with both valves free from the tube.

a. Inequivalve, edentulous; tube straight, striated transversely, and furnished, when complete, with a perforated septum behind the valves.

1. Genus GASTROCHÆNA, Spengler. 1780.

Gastrochæna, (including Rocellaria.)
Spengler, Nov. Act. Soc. Sc. Havn. ii. 1780.
Blainville, Malacologie, p. 574, 1825.
Rang, Tabl. Meth. p. 342, 1829.
Deshayes, Traite Elem. i. pt. 2, p. 26, 1843—'50.
Gastrochæna, (as at present restricted.)
Mörch, Catalogue, 1853.
H. and A. Adams, Genera, ii. p. 334, 1856.
Chæna, Retzius, Nov. Test. Gen. p. 19, 1788, (including Rocellaria.)
Schumacher, Essai d'un Nov. Syst. p. 94, 1817, (including Rocellaria.)
Gray, Zool. Proc. London, p. 189, 1847.
" " " " p. 315, 1858.
Deshayes, Zool. Proc. London, p. 330, 1854.
Woodward, Manual, p. 326, 1854, (as a subgenus of Gastrochæna, Rocellaria.)
Fistulana, Bruguiere, Encyc. Meth. Vers. 1789.
Cuvier, Regne Anim. Ed. primo, ii. p. 494, 1817.
Lamarck, Anim. Sans. Vert. v. p. 432, 1818.
" (Deshayes' edit.) Anim. Sans. Vert. vi. p. 25, 1835.

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*Gray's subfamily GASTROCHÆNAINA is made to include only the species of *Rocellaria*, (by him wrongly named *Gastrochæna*,) while the genus *Gastrochæna* he has placed, under the name of *Chæna*, in another subfamily CHÆNAINA. I include the two genera in one subfamily. I also include a third genus, recently proposed by Dr. Gould.

Fistulana, Ferussac, Tabl. Syst. p. 45, 1822.
Bosc, Hist. Nat. des Coquilles, ii. p. 205, 1824.
Deshayes, Encyc. Meth. ii. p. 139, 1830.
Wyatt, Conch. p. 24, 1838.
Hanley, Descriptive Catalogue, p. 3, 1842.
Reeve, Conch. Syst. 1843.
Catlow and Reeve, Conch. Nomenc. p. 2, 1845.
Jay. Catalogue, 4th edit. p. 8, 1850.
Teredo, partim.
Linnæus, Gmelin, Dillwyn.

Description.—Valves irregular, unequal, widely gaping, hinge edentulous, ligament narrow; pallial sinus deep, posterior muscular impression nearly central, with a pedal scar in front. Tube straight, cylindrical, striated transversely, tapering upwards, closed at the lower end, with a perforated septum behind the valves.

A tropical genus, burrowing in sand or mud, at low water mark; with the upper part of the tube projecting but little above the surface.

b. Equivalve, edentulous, but the hinge generally with a small spatulate lamina. Tube irregular.

2. Genus Rocellaria, Fleuriau de Bellevue. 1802.

Rupellaria, Fleuriau de Bellevue, Journ. de Physique, liv. 1802.
Roxellaria, Agassiz, Nomenclator Zoologicus.
Rocellaria, Mörch, Catalogue, 1853.
H. and A. Adams, Genera, ii. p. 335, 1856.
Gastrochæna, Cuvier, Regne Anim. Ed. primo, ii. p. 490, 1817.
Lamarck, Anim. Sans. Vert. v. p. 446, 1818.
" (Desh. edit.) Anim. Sans. Vert. vi. p. 48, 1835.
Ferussac, Tabl. Syst. p. 45, 1822.
Turton, Conch. Dithyra Brit. p. 17, 1822.
Crouch, Introd. Lam. 1827.
Fleming, Brit. Anim. 1828.
Rang, Tabl. Meth. p. 342, 1829.
Bouchard-Chantreaux, Moll. Boulonnais, p. 8, 1829.
Della Chiaje, Anim. Senza Vert.
Collard de Cherres, Cat. Test. Mar. p. 9, 1830.
Lukis, Loudon's Mag. Nat. Hist. vi. p. 401, 1833.
Sowerby, Zool. Proc. p. 21, 1834; Conch. Man. edit. 2, 1842.
Th. Müller, Syn. Test. Viv. p. 235, 1836.
Anton, Verzeich der Conch. p. 1, 1839.
Hanley, Descriptive Catalogue, p. 10, 1842.
Reeve, Conch. Syst. 1843.
Potiez et Michaud, Gallerie des Moll. ii. p. 267, 1844.
Thorpe, Brit. Mar. Conch. p. 33, 1844.
Philippi, Enum. Moll. Sicil. ii. p. 3, 1844.
Catlow, Conch. Nomenc. p. 2, 1845.
Gray, Zool. Proc. p. 189, 1847.
" " " p. 316, 1858.
D'Orbigny, Mollusks, Sagra's Cuba.
Requier, Cat. des Coq. de la Corse, p. 13, 1848.
Jay, Catalogue, 4th edit. p. 8, 1850.
Deshayes, Mollusques, Expl. Sci. de l'Algerie, p. 17.
" Proc. Zool. Soc. London, p. 326, 1854.
Forbes and Hanley, Hist. Brit. Moll. i. p. 130, 1853.
Woodward, Manual, pt. 2, p. 325, 1854.
Carpenter, Mazatlan Shells, Brit. Mus. Cat. p. 14, 1857.
Beau, Cat. des Coq. Guadaloupe, 1858.

Gastrochæna, (including both Gastrochæna and Rocellaria.)
Spengler, Nov. Act. Sc. Soc. Havn. ii. 1780.
Blainville, Malacol. i. p. 574, 1825.
Deshayes, Traite Elem. i. pt. 2, p. 26, 1843—'50.
Chæna, (partim,) Retzius, Nov. Test. Gen. p. 19, 1788.
Gray, Figs. Moll. Anim. v. 1857.
Mya, (partim,) Pennant, Brit. Zool. iv. 1777.
Donovan, Brit. Shells, iii. 1801.
Montagu, Test. Brit. i. 1803.
Maton & Rackett, Linn. Trans. viii. 1807.
Wood, Gen. Conch. edit. 1, 1815.
" Index Test, edit. 1, 1818; edit. 2, 1828.
De Gerville. Cat. des Coq. de la Manche, 1825.
Chama, DaCosta, Brit. Conch. 1778.
Pholas, (partim,) Chemnitz, Conch. Cab. x. 1788.
Gmelin, Syst. Nat. i. 1790.
Poli, Test. utr. Sicil. i. 1791.
Olivi, Adriatica, 1792.
Schreibers, Versuch nach Conchylien, ii. 1793.
Pultney, Dorsetshire Catalogue, 1799.
Dillwyn, Descriptive Catalogue, i. 1817.
Wood, Gen. Conch. ed. 1, 1815.
" Index Test, edit. 1. 1818; edit. 2, 1828.
Mytilus, (partim,) Dillwyn, Descriptive Catalogue. i. 1817.
Fistulana, (partim,) Bosc, Hist. Nat. des Coq. ii. p. 205, 1824.
Deshayes, Encyc. Meth. Vers. ii. p. 139, 1830.
Philippi, Enum. Moll. Sicil. i. p. 2, 1836.

Description.—Shell regular, equivalve; valves ovate or cuneiform, widely gaping anteriorly, very inequilateral; umbones anterior, ligament long and narrow. Pallial line lightly impressed, sinuated, uniting the muscular impressions.

Tube claviform or irregular, often incomplete, perforating shells and limestone, to which its walls are sometimes adherent.

Subgenus Spengleria, Tryon. 1861.

I propose to separate from Rocellaria those species which are elongate-cuneiform, truncated at the posterior end of the shell, and having a triangular space, radiating from the beaks posteriorly to the margin, elevated slightly above the general surface of the shell, and ornamented with transverse lamellæ.

3. Genus Cucurbitula, Gould. 1861.

Cucurbitula, Gould, Proc. Bost. Soc. Nat. Hist. viii. p. 22, March, 1861.
Fistulana, Gastrochæna, Chæna, &c. } Partim. of authors.

[6] *Description.*—Shell regular, elongate, equivalve, gaping the whole length, anteriorly enveloped by the mantle of the animal.

Tube very short, ovate, or gourd-shaped, composed of successive calcareous layers or cups, involving bits of shell or sand. Attached by one side to shells, &c.

I quite agree with Dr. Gould in the propriety of erecting a new genus for the well known Gastrochæna l a g e n u l a. The characters given above prove it to be quite distinct from Gastrochæna or Rocellaria.

Subfamily 2. BRYOPINÆ, Tryon. 1861.

Shell with the right valve only free, the left being imbedded in the tube.

4. Genus Bryopa, Gray. 1840.

Bryopa, Gray, Syn. Brit. Mus. 1840.
" Proc. Zool. Soc. p. 314, 1858.
H. and A. Adams, Genera, ii. p. 649, 1858.
Clavagella,* Lamarck, Anim. Sans. Vert. v. p. 430, 1818.
" (Desh. edit.) Anim. Sans. Vert. vi. p. 22, 1835.
Ferussac, Tabl. Syst. p. 45, 1822.
Della Chiaje, Anim. Senza Vert.
Sowerby, Genera.
Blainville, Malacol. p. 575, 1825.
Crouch, Introd. Lam. p. 5, 1827.
Rang, Man. Moll. p. 338, 1829.
Broderip, Zool. Proc. London, p. 115, 1834.
" Zool. Trans. London, i. p. 261, 1835.
Owen, " " " i. p. 269, 1835. (Anatomy.)
Cuvier, Regne Anim. (Audouin's edit.) 1836.
Th. Müller, Syn. Test. Viv. 1836.
Philippi, Weigmann's Archiv. für Naturg. i. 1840.
" Enum. Moll. Sicil. i. p. 1, 1836; ii. p. 1, 1844.
Reeve, Conch. Syst. 1843.
Hanley, Descriptive Catalogue. p. 2, 1842.
Cailliaud, Guerin's Mag. Zool. 1842.
" Chenu's Illustrations Conch.
Forbes, Report on Ægean Invert., Brit. Assoc. p. 142, 1843.
Deshayes, Traite Elem. i. pt. 2, p. 16, 1843—'50.
" Expl. Sci. de l'Algerie, Mollusques, p. 1.
Catlow, Conch. Nomenc. p. 2, 1845.
Jay, Catalogue, 4th edit. p. 3, 1850.
H. and A. Adams, Genera, ii. p. 337, 1854.
Gray, Figs. of Moll. Anim. v. 1857.
Teredo, (partim,) Brocchi.

Description.—Valves flat, irregular, unequal, the right free, the left always imbedded when adult. Pallial sinus deep. Anterior muscular impression small, posterior one large.

Tube elongated, cylindrical, open at the posterior end, and furnished with siphonal fringes; the anterior or lower end compressed, clavate, simple, with a minute central fissure.

Subgenus Dacosta, Gray. 1858.

Dacosta, Gray, Zool. Proc. London, p. 315, 1858.
H. and A. Adams, Genera, ii. p. 649, 1858.

Posterior or upper end of the tube destitute of siphonal fringes.

Subfamily 3. CLAVAGELLINÆ, Gray. 1858.

Distinguished from Bryopinæ by the presence of radiated tubuli on the lower end of the tube, thus forming a connecting link between Bryopinæ and Penicillinæ.

(Contains the fossil genus Clavagella.)

Subfamily 4. PENICILLINÆ, Gray. 1858.

Shell with both valves imbedded in the walls of the tube, with their umbones visible externally. Base of the tube ornamented with radiated tubuli, containing tentacular processes originating in the animal's mantle.

* The genus *Clavagella*, as characterized by Lamarck, includes those species (only known in a fossil state) in which the lower end of the tube is surrounded by hollow spinous processes. Lamarck included the recent species in his genus, under the impression, probably, that their tubes were incomplete.

5. Genus Brechites, Guettard. 1774.

Brechites, Guettard, Mem. de l'Academie Paris, ii. p. 18, 1774.
Mörch, Catalogue, 1853.
H. and A. Adams, Genera, ii. p. 338, 1856.
" " " ii. p. 649, 1858.
Phallus, (partim,) Lister, Historiæ Conchyliorum, 1685—'92.
Rumphius, Amboinsche Rareit. 1705.
Gualtieri, Test, 1742.
Tubulus, (partim,) Bonanni, Recreatio Oculi, &c., 1684.
Klein, Tab. Mar. Gen. 1734.
Martini, Conch. i. 1769.
Venus, (partim,) Rumphius, Amboinsche Rareit, 1705.
Solen, (partim,) Klein, Ostracologicæ, p. 163, 1753.
Arytæna, (partim,) D'Argenville, Conchyliologie, 2d ed. 1757.
Favanne, Conch. 1780.
Oken, Lehrbuch, p. 379, 1815.
Penicillus, (partim,) Bruguierè, Encyc. Meth. Vers. p. 126, 1789.
Lamarck, 1801.
Gray, Genera, Zool. Proc. p. 188, 1847.
Clepsydra, (partim,) Meuschen.
Schumacher, Essai d'un Nov. Syst. pp. 79 and 261, 1817.
Serpula, (partim,) Linnæus.
Schroeter, Einleit. Conch. ii. 1784.
Gmelin, Syst. Nat. i. 1790.
Born.
Schreibers, Versuch nach Conchyl. ii. 1793.
Dillwyn, Descriptive Catalogue, 1817.
Wood, Index Test. edit. 1, 1818; edit. 2, 1828.
Knorr, Vergnüg. iv. 1772.
Martini, Conch. Cabinet, i. 1769.
Shaw, Nat. Misc. vi.
Brooke's Conchology, 1815.
Mawe, Conch. 1823.
Woodarch, Introd. 1831.
Verpa, Bolten, Mus. Bolt. edit. 2, 1819.
Aquaria, Perry, Conch. 1811.
Adspergillum, Menke, Syn. Meth. Moll. 1830.
Arrosoir, Favanne, 1780.
D'Argenville, 1742.
Bruguierè, Encyc. Meth. p. 126, 1789.
Aspergillum, (partim,) Bruguiere, 1789.
Lamarck, Anim. Sans Vert. v. p. 428, 1818.
" (Desh. ed.) Anim. Sans. Vert. vi. p. 19, 1835.
Ferussac, Tabl. Syst. p. 45, 1822.
Blainville, Malacologie, p. 576, 1825.
Sowerby, Genera.
Crouch, Introd. Lamarck, p. 5, 1827.
Chenu, Illust. Conch. Aspergillum.
Rang, Hist. Nat. des Moll. p. 337, 1829.
Wyatt, Conch. p. 23, 1838.
Cuvier, Regne Anim. (Audouin's edit.)
Anton, Verzeich der Conchyl. p. 122, 1839.
Reichenbach, Conchylien, 1842.
Hanley, Descriptive Catalogue, p. 1, 1842.
Reeve, Conch. Syst. 1843.
" Conchologia Iconica, Monog. Aspergillum, 1860.
Deshayes, Traite Elem. i. pt. 2, p. 8, 1843—'50.
Potiez et Michaud, Gallerie des Moll. ii. p. 273, 1844.

Aspergillum, (partim,) Savigny, Expl. Egypt. Moll.
Guerin, Iconog. du Regne Anim.
Philippi, Enum. Moll. Sicil. i. p. 2, 1836 ; ii. p. 2, 1844.
Catlow, Conch. Nomenc. p. 1, 1845.
Rüppell, Reise Nord Afric.
Jay, Catalogue, p. 8, 4th ed. 1850.
Woodward, Manual, pt. 2, p. 327, 1854.
Gray, Figs. Moll. Animals, v. 1857.
" Zool. Proc. p. 311, 1858.

Description.—Shell small, oval, equivalve, equilateral, imbedded in the wall of the tube, and visible externally.

Tube elongated, attenuated and open above, swelling, and closed below by a convex diaphragm, with numerous margined perforations and a narrow central fissure ; the circumference ornamented with one or more fringes of tubuli. The upper or siphonal end of the tube plain.

Surface of the tube wavy, depressed around the small pair of open valves.

Inhabiting tropical countries, and living buried in sand or mud at low water mark.

Subgenus Warnea, Gray. 1858.

Warnea, Gray, Zool. Proc. p. 309, 1858.
H. and A. Adams, Genera, ii. p. 649, 1858.

The siphonal end of the tube fringed with from one to several rows of ruffles.

6. Genus Penicillus, Gray, 1858, (not Bruguiere.)

Penicillus, Gray, Zool. Proc. 312, 1858.
H. and A. Adams, Genera, ii. p. 649, 1858.
Aspergillum (partim) of authors.

Description.—The valves not surrounded by wavy depressions on the surface of the tube. Disk surrounded by a single fringe of tubuli.

Subgenus Clepsydra, Gray, 1858, (not Meuschen or Schumacher.)

Clepsydra, Gray, Zool. Proc. p. 312, 1858.
H. and A. Adams, Genera, ii. p. 649, 1858.

Fringe of the disk consisting of two or three series of tubes.

7. Genus Fœgia, Gray. 1840.

Fœgia, Gray, Syn. Brit. Mus. 1840.
" Zool. Proc. p. 313, 1858.
H. and A. Adams, Genera, ii. p. 649, 1858.
Aspergillum (partim) of authors.

Description.—Valves not surrounded by wavy depressions ; covered more or less by a sunken tubercle in front. Disk of the tube fringed.

Subgenus Arytene, Gray, 1858, (not Oken or Megerle.)

Arytene, Gray, Zool. Proc. p. 313, 1858.
H. & A. Adams, Genera, ii. 650, 1858.

Disk of the tube not fringed.

8. Genus Humphreyia, Gray. 1858.

Humphreyia, Gray, Zool. Proc. London, p. 316, 1858, and Ann. and Mag. N. H. 3d ser. ii. p. 16, 1858.
H. and A. Adams, Genera, ii. p. 650, 1858.
Brechites, (Fœgia,) H. and A. Adams, Genera, ii. p. 339, 1856.
Aspergillum, A. Adams, Zool. Soc. Proc. p. 91, 1852.
Reeve, Monog. Asp. Conch. Iconica, 1860.

Description.—The tube attached by its base to shells or stone, and much distorted in growth.

But two specimens are known, of the only species of this genus, and they are entirely too much distorted in appearance to furnish reliable characters. They exhibit, however, a close relationship to *Brechites*, etc., from which they may be distinguished by their adherence to foreign bodies. This character is sufficient to justify the separation made by Dr. Gray, under the name of *Humphreyia;* and, until we are better acquainted with these shells, it is as well to allow the genus to rest on it alone. Dr. Gray has attempted more, and incurred thereby the criticism in Reeve's Monograph, which we have already quoted.

*Species of Gastrochænidæ.**

Gastrochæna.

1. G. agglutinans, Deshayes, sp.

Chæna agglutinans, Deshayes, Proc. Zool. Soc. Lond. p. 330, 1854.

Gastrochæna agglutinans, H. and A. Adams, Genera, ii. p. 335, 1856.

Description.—"G. vaginâ minimâ, elongato-clavatâ, posticè valdè attenuatâ, corticè valdè et irregulariter transversim plicato, corporâ alienâ agglutinante. Testâ elongato-paulo latiore, extus ut in Solenibus bipartitâ, partè alterâ subplanâ, arcuatim striatâ, alterâ longitudinaliter tenuissime striatâ; laterè antico brevissimo, abruptè truncato, cucullato, angulo acuto circumscripto, radiatim tenue lirato, liris subgranosis; impressione musculari posticâ paulo post medianâ, minimâ; sinu pallii profundo, acutissimo."—*Deshayes.*

Hab.—Zebu, Philippines. Coll. Cuming.

Remarks.—This shell is distinguished from G. mumia by its agglutinated tube, the division of the surface of the valve into two parts, and their peculiar striation. G. grandis has, like this species, an agglutinated tube, but its valves are carinate and sulcate, and differently formed.

2. G. grandis, Deshayes, sp.

Chæna grandis, Deshayes, Proc. Zool. Soc. Lond. p. 330, 1854.

Gastrochæna grandis, H. and A. Adams, Genera, ii. p. 335, 1856.

Description.—"G. vaginâ elongato-clavatâ, regulari, rectâ, transversim rugatâ, posticè attenuatâ, sabuletis in corticè agglutinante. Testâ elongato-angustâ, hiantissimâ, posticè latiorè spathulatâ, ad latus anticum sensim attenuatâ; laterè antico brevissimo, subito truncato et angulo acuto distincto, in medio valdè carinato vel cristato, radiatim inæqualiter sulcato, sulcis inæqualibus novem ad decem, quinque majoribus denticulo acuto terminatis; cardine lineari, simplici; impressione musculari posticâ in medio longitudinis posita; sinu pallii profundo, acutissimo."—*Deshayes.*

Hab.—Zebu, Philippine Islands. Coll. Cuming.

3. G. mumia,* Spengler.

Gastrochæna mumia, Spengler, Nov. Act. Sc. Soc. ii. p. 174, f. 1—7, 1783.
" Journ. Nat. Hist. Soc. Copenh. iii. p. 20, t. 2, f. 1, 1*a*.
Favanne, Conch. t. 5, f. *k*, 1780.
Deshayes, Traite Elem. p. 32, t. 2, 1843—'50.
Mörch, Catalogue, 1853.
H. and A. Adams, Genera, iii. t. xci. f. 1, 1*a*, 1855.

Chæna mumia, Retzius, Nov. Test. Gen. p. 19, 1788.
Schumacher, Essai d'un Nov. Syst. p. 94, 1817.
Woodward, Manual, t. 23, f. 16, 1854.

Chæna tessellata, Gray, Zool. Proc. p. 315, 1858.

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* Those species marked with a star are contained in the collection of the Academy of Natural Sciences of Philadelphia.

Fistulana mumia, Catlow, Conch. Nomenc. p. 2, 1845.
Jay, Catalogue, 4th ed. p. 8, 1850.
Fistulana clava, Lamarck, Anim. Sans Vert. v. p. 435, 1818.
" (Desh. edit.) Anim. Sans. Vert. vi. p. 30, 1835.
Cuvier, Regne Anim. 1st edit. ii. p. 494, 1817.
" " " (Audouin's edit.) t. 116, f. 1, *a*, *b*, *c*.
Sowerby, Genera, No. 27, f. 1—5.
Bosc, Hist. Nat. des Coq. ii. p. 204, 1824.
Blainville, Malacol. t. 81, f. 3, 1825.
Deshayes, Encyc. Meth. Vers. ii. p. 140, 1830.
Wyatt, Conch. t. 33, f. 5, 1838.
Reeve, Conch. Syst. t. 19, 1843.
Hanley, Desc. Cat. p. 3, t. 11, f. 5, 1842.
Teredo clava, Gmelin, 3748, 1790.
Dillwyn, Desc. Cat. ii. p. 1090, 1817.

Description.—"G. vaginâ tereti clavatâ, rectâ, tenuissimâ, fragili; testæ valvis elongatis, anticè contortis, uncinatis, regulariter striato-plicatis."—*Deshayes.*

Hab.—India, Philippine Islands.

This is the well known type of the old genus Fistulana. Very excellent figures of it are given in the works of Deshayes, Cuvier, Blainville and Sowerby, quoted above.

G. (Chæna) annulata, Gray, B. M., *Hab.* Mozambique, Mauritius, is mentioned in the Zool. Proc. Lond. for 1858, but without description.

Rocellaria.

Considerable diversity of form exists among the species of this genus, and their separation into groups would probably facilitate their study; this we are unfortunately not able to do in a very perfect manner, in consequence of the extreme paucity of some of the descriptions. We have separated a subgenus Spengleria, and propose to divide the remaining species into two groups.

1st. Those whose shells are short and ovate. Ex R. dubia, hians, etc.

2d. Those possessing elongate-cuneiform shells. Ex R. apertissima, etc.

It has been proposed to create a separate genus or subgenus for those species possessing a large spathulate hinge lamina, and it is not at all improbable that future researches will show the necessity for such division. It will be seen that in a majority of the species the anterior hiatus is very long, equalling the entire, or nearly the whole length, of the shell. There are marked exceptions to this, however, in several species, the hiatus in R. humilis, for instance, scarcely reaching to the middle of the shell. The umbones are always placed near the anterior margin, and they are sometimes terminal. Differences also occur in the width, length, prominence and color of the ligament, in the contour of the margins, in the relative proportions of the sides anterior and posterior to the beaks, the form of the hiatus, character of the striation, the thickness of the valves, the size of the spathulate hinge lamina, (which is *generally* minute or obsolete,) and in the form of the interior impression.

a. Valves short, ovate.

1. R. brevis, Sowerby, sp.

Gastrochæna brevis, Sowerby, Zool. Proc. Lond. p. 21, 1834.
Th. Müller, Syn. Test. Viv. p. 335, 1836.
Hanley, Desc. Cat. p. 11, 1842.
Catlow, Conch. Nomenc. p. 2, 1845.
Rocellaria brevis, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ breviter ovatâ, tenui, pellucidâ, striatâ, striis exilissimis; longitudinè lateris antici octavum partim testæ æquante. Long. 0·8. lat. 0·5, alt. 0·5, poll."—*Sowerby.*

Hab.—"Ad Insulas Gallapagos et apud Insulam Lord Hood's dictam. Found in pearl oysters, in from three to seven fathoms."—*Sowerby.*

2. R. denticulata, Deshayes, sp.

Gastrochæna denticulata, Deshayes, Zool. Proc. Lond. p. 327, 1854.
Rocellaria denticulata, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ ovato-ventricosâ, brevi, solidulâ, latâ, hiantissimâ, hiatu ovato, lato, infernè attenuato et tertiam partem posticam testæ attingente; valvis subtrapezoidalibus transversim striato-lamellosis, in laterè antico striis imbricatis, crispato-denticulatis, in laterè postico erectis, distantioribus; laterè antico satis elongato, recto, in suturâ cristato; umbonibus tumidulis, subumbilicatis; ligamento angusto, elongato, fulvo."—*Deshayes.*

Hab.—Columbia. Coll. Cuming.

This is a heavy shell, while R. brevis is thin and pellucid. It is also more prominently striated than that species, and differs from it in shape.

3. R. dubia,* Pennant, sp.

Mya dubia, Pennant, Brit. Zool. iv. p. 82, t. 44, f. 19, 1777.
Donovan, British Shells, iii. t. 108, 1810.
Maton and Rackett, Linn. Trans. viii. p. 33, 1807.
Wood, Gen. Conch. p. 102, t. 25, f. 2, 3, 1815.
" Index Test, edit. 1, p. 11, 1818.
" " " edit. 2, t. 2, f. 23, 1828.
Gerville, Cat. des Coq. de la Manche, p. 10, 1825.
Mya Pholadia, Montagu, Test. Brit. i. p. 28 et 559, et supp. p. 20, 1803.
Fleming, Edinb. Encyc. ii. p. 87.
Chama parva, DaCosta, Brit. Conch. p. 234, 1778.
Pholas faba, Pultney, Dorsetshire Catalogue, p. 27, 1799.
Pholas pusilla, Poli, Test. utr. Sicil. i. p. 50, t. 7, f. 12, 13, 1791.
Olivi, Adrit. p. 93, 1792.
Mytilus ambiguus, Dillwyn, i. p. 304, 1817.
Balano minimo, Ginanni, Op. post. ii. p. 35, t. 23, f. 164, 1755—'57.
Gastrochæna Pholadia, Turton, Conch. Dithyra Brit. p. 18, t. 2, f. 8, 9, 1822.
Lukis, Loudon's Mag. Nat. Hist. vi. p. 404, f. 52, 1833.
Brown, Illust. Brit. Conch. 2d ed. p. 116, t. 48, f. 13, 14, 1844.
Gastrochæna hians, Fleming, Brit. Anim. p. 458, 1828.
Gastrochæna cuneiformis, Philippi, Enum. Moll. Sicil. i. p. 2, 1836.
Gastrochæna Polii, Philippi, Enum. Moll. Sicil. ii. p. 3, 1844.
Requier, Cat. des Coq. de la Corse, p. 13, 1848.
Gastrochæna (Chæna) faba, Gray, Figs. Moll. Anim. v. p. 28, t. 339, f. 2, 3, 4; t. 347, f. 6—8, 1857.
Gastrochæna modiolina, Lamarck, Anim. Sans Vert. v. p. 447. 1818.
" (Desh. edit.) Anim. Sans Vert. vi. p. 49, 1835.
Sowerby, Genera, f. 1, 2, 1820—'24.
" Conch. Manual, f. 52, 1842.
Crouch, Introd. Lamarck, t. 2, f. 12, *a*, *b*, 1827.
Bouchard-Chantreaux, Moll. Boulonnais, p. 8, 1829.
Collard de Cherres, Cat. Test. Mar. p. 9, 1830.
Hanley, Desc. Cat. p. 10, 1842.
Cailliaud, Guerin's Mag. Zool. Moll. p. 2, t. 69, 70, 71, 1843.
Reeve, Conch. Syst. t. 50, f. 1, 2, 1843.
Potiez et Michaud, Gallerie des Moll. ii. p. 268, 1844.

Gastrochæna modiolina, Thorpe, Brit. Mar. Conch. p. 33, 1844.
Jay, Catalogue, 4th ed. p. 9, 1850.
Leach, Moll. Great Britain, p. 256, t. 3, f. 3, 1852.
Forbes and Hanley, Brit. Moll. i. p. 132, t. 2, f. 5—8, and t. F, f. 5, (animal,) 1853.
Woodward, Manual, pt. 2, t. 23, f. 15, 1854.
Gray, Proc. Zool. Soc. Lond. p. 316, 1858.
Gastrochæna dubia, Philippi, Wiegmann's Archiv. Natur. t. 7, f. 1, 1845.
Catlow, Conch. Nomenc. p. 2, 1845.
Deshayes. Expl. Sci. de l'Algerie, Moll. p. 34.
" Traite Elem. i. pt. 2, p. 34, t. 2, f. 4, 5, 1843—'50.
Rocellaria dubia, H. and A. Adams, Genera, iii. t. xci. f. 2, *a*, *b*, *c*, 1855.

Description.—"R. vaginâ pyriformi, contortâ, crassâ intus, ad aperturam bicarinatâ; testâ ovato-oblongâ, angustâ, transversim striatâ, anticè sinuatâ; natibus prominulis, laterè antico brevissimo."—*Deshayes.*

Hab.—England, Mediterranean.

This species may be readily distinguished from the others by the slight truncation of the margin at the posterior end of the shell, by its short, wide hiatus, and its large laminar hinge-plate.

There are many excellent figures in the list of works quoted above, and a very full description is contained in the "British Mollusca" of Messrs. Forbes and Hanley.

4. R. hians,* Chemnitz, sp.
Pholas hians, Chemnitz, x. p. 364. t. 172, f. 1678 and 1679. 1788.
Gmelin, Syst. Nat. 3217, 1790.
Schreibers, Versuch nach Conch. ii. p. 367, 1793.
Dillwyn, Desc. Cat. i. p. 39, 1817.
Wood, Gen. Conch. p. 85, 1815.
" Index Test, 1st ed. p. 9, 1818.
" " " 2d ed. t. 2, f. 11, 1828.
Fistulana rupestris, Bosc, Hist. Nat. des Coq. ii. p. 205, 1824.
Chæna cuneiformis, Retzius, Nov. Test. Gen. p. 19, 1788.
Gastrochæna cuneiformis, Spengler, Nov. Act. Sc. Soc. ii. p. 179, f. 8—11, 1783.
Lamarck, Anim. Sans Vert. v. p. 447, 1818.
" (Desh edit.) Anim. Sans Vert. vi. p. 49, 1835.
Rang, Tabl. Meth.
Sowerby, Genera, f. 3, 4, 5, 1820—'24.
Blainville, Man. de Malacol. p. 574, t. 79, f. 5, 1825.
Anton, Verzeich der Conchyl. p. 1, 1839.
Hanley, Desc. Cat. p. 10, 1842.
Reeve, Conch. Syst. t. 20, f. 4, 5, 1843.
Potiez et Michaud, Gallerie des Moll. ii. p. 267, 1844.
Catlow, Conch. Nomenc. p. 2, 1845.
Jay, Catalogue, 4th ed. p. 8, 1850.
D'Orbigny, Sagra's Hist. de l'Isle de Cuba, Moll. p. 228, 1853.
Beau, Cat. des Coq. Guadaloupe, p. 27, 1858.
Gastrochæna hians, Gray, Zool. Proc. Lond. p. 316, 1858.
Rocellaria hians, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ ovatâ, cuneiformi, tenui, albidâ, subpellucidâ, concentricè densè striatâ, laterè anali elongato, rotundato; laterè anali brevi, angustato, acuminato; laterè palleali hiante."—*D'Orbigny.*

Hab.—West Indies.

This species is represented by Chemnitz's figures, Nos. 1678 and 1679. Nos. 1680 and 1681 represent R. rostrata. Several writers have confounded the two under one description, although they are really very different. R. hians has also been frequently confounded with R. dubia of Europe.

5. R. humilis,* Deshayes, sp.

Gastrochæna humilis, Deshayes, Proc. Zool. Soc. Lond. p. 327, 1854.
Rocellaria humilis, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ parvâ, elongato-ovatâ, tumidâ, tenui, albâ, hyalinâ, fragili, aperturâ anticâ ovato-acuminatâ, dimidiam partem testæ vix æquante, oblique sectâ et rectilineâ; valvis subtrapezoidalibus, regulariter striato-sublamellosis, striis continuis, antice approximatis, in medio paulo distantioribus et prominentioribus; umbonibus tumidulis, approximatis; laterè antico brevissimo, in suturâ cristatâ, parum obliquo; ligamento angusto, elongato, nigro."—*Deshayes.*

Hab.— Philippines, Zebu, (Cuming.) West Indies? Mus. Brit., Gray.

The hiatus in this species scarcely reaches to the middle of the shell, whilst it is not less than two-thirds the total length in any other species.

6. R. hyalina, Sowerby, sp.

Gastrochæna hyalina, Sowerby, Zool. Proc. p. 22, 1834.
Th. Müller, Syn. Test. Viv. p. 236, 1836.
Hanley, Desc. Cat. p. 11, 1842.
Catlow, Conch. Nomenc. p. 2, 1845.
Rocellaria hyalina, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ ovali, albidâ, hyalinâ, lævi, dorso longitudinaliter striato; laterè antico brevi; hiatu duos trientes testæ æquante. Long. 0·55, lat. 0·25, alt. 0·3 poll."—*Sowerby.*

Hab.—Lord Hood's Isle.

Sowerby's descriptions of species in this genus are entirely too short and indefinite for satisfactory recognition. Having no specimens, we are not able to give any opinion regarding the validity of his species, and therefore we are compelled to insert them with the original Latin descriptions.

7. R. intersecta, Deshayes, sp.

Gastrochæna intersecta, Deshayes, Zool. Proc. London, p. 327, 1854.
Rocellaria intersecta, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ ovato-oblongâ, brevi, cuneiformi, tenui, fragili, candidâ, oblique hiante, hiatu ovato, acuminato, dimidiam partem testæ æquante, valvis subspathulatis, anticè angustis, posticè dilatatis, striatis, striis anticis regularibus extremitate detectis, æquidistantibus, arcuatis et in medio evanescentibus et medianis interpositis, striis medianis inæqualibus, majoribus distantibus; laterè antico brevissimo, fere nullo; umbonibus minimis, subterminalibus."—*Deshayes.*

Hab. ——— ? Coll. Cuming.

8. R. lævigata, Deshayes, sp.

Gastrochæna lævigata, Deshayes, Zool. Proc. Lond. p. 326, 1854.
Rocellaria lævigata, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ ovato-cuneiformi, tenui, pellucidâ, fragili, candidissimâ, ventricosâ, latè hiantè, hiatu cordiformi, dimidiam partem testæ paulo superante; valvis lævigatis; laterè antico striis aliquibus regularibus, ad mediam partem arcuatis et evanescentibus; umbonibus minimis, obliquis, approximatis, laterè antico brevissimo, recto."—*Deshayes.*

Hab. ——— ? Coll. Cuming.

9. R. macroschisma, Deshayes, sp.

Gastrochæna macroschisma, Deshayes, Proc. Zool. Soc. p. 326, 1854.
Rocellaria macroschisma, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ ovatâ, brevi, ventricosâ, tenui, fragili, candidâ,

anticè hiantissimâ, hiatu subcordiformi, lato, obliquo, et fere totam altitudinem testæ æquante; valvis trapezoidalibus, tenuissime striatis, striis in laterè antico tenuissimus, appressis, in medio distantioribus, erectis, sublamellosis; laterè postico obtuso, supernè in suturâ cristato; umbonibus tumidis, posticè depressiusculis, laterè antico brevi, recto; sinu pallii parum profundo, apicè acuto, triangulari, subæquilaterali."—*Deshayes.*

Hab. ——— ? Coll. Cuming.

10. R. ovata,* Sowerby, sp.

Gastrochæna ovata, Sowerby, Zool. Proc. p. 21, 1834.
Th. Müller, Syn. Test. Viv. p. 235, 1836.
Hanley, Desc. Cat. p. 10, t. 9, f. 42, 1842.
Catlow, Conch. Nomenc. p. 2, 1845.
Jay, Catalogue, 4th edit. p. 9, 1850.
Carpenter, Mazatl. Shells, Brit. Mus. Cat. p. 15, 1857.

Rocellaria ovata, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ ovatâ, albicantè, longitudinaliter striatâ, striis exilibus, lamellosis, formam marginis semper sequentibus; longitudinè lateris antici quintam partem testæ æquante. Long. 1·2, lat. 0·7, alt. 0·7 poll."—*Sowerby.*

Hab.—In Sinu Panamensi (Isle of Perico) et ad Insulam Platæ. Found in spondyli at the Isle of Perico, and in coral rocks, at a depth of seventeen fathoms, at the Island of Plata. Also inhabits St. Thomas Harbor, W. I., (Coll. A. N. S.) and Charleston Bay, S. Carolina! (Coll. Smithsonian Inst.)

The great difference in the relative length of the anterior and posterior sides will readily distinguish this species from R. brevis. R. dubia has a slight truncation of the posterior margin of the valves, while this species is always rounded posteriorly. The absence of the laminar hinge-plate and the length of the hiatus also separate this shell from both R. dubia and R. hians.

I have made a very close comparison between specimens from Panama and those from the West Indies and Charleston, without detecting the slightest difference between them. The Charleston specimens were collected by Dr. Wm. Stimpson.

11. R. pupina, Deshayes, sp.

Gastrochæna pupina, Deshayes, Proc. Zool. Soc. Lond. p. 326, 1854.
Rocellaria pupina, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. vaginâ crassâ, brevi, clavatâ, transversim articulatâ, lævigatâ, nullâ corporâ alienâ agglutinante, in cavitate valvulæ affixa. Testâ minimâ, tenui, albâ, hyalinâ, hiantissimâ, hiatu amplissimo quasi testæ per mediam partem resecto, oblique inæqualiter bipartitâ, coarctatâ, extremitate posticâ clausâ, obtusâ, attenuatâ; laterè antico satis longo, incumbente, cucullato; umbonibus prominulis, oblique terminalibus; valvis lævigatis, posticè suturâ brevi, carinatâ; margine aperturæ dorsali, parallelo."—*Desh.*

Hab.—Morton Bay. Coll. Cuming.

12. R. rugulosa, Sowerby, sp.

Gastrochæna rugulosa, Sowerby, Zool. Proc. Lond. p. 22, 1834.
Th. Müller, Syn. Test. Viv. p. 235, 1836.
Hanley, Desc. Cat. p. 11, 1842.
Catlow, Conch. Nomenc. p. 2, 1845.

Rocellaria rugulosa, H. & A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ oblongâ, albidâ, striatâ, rugulosâ, striis anticis marginem hiantem confertis, acutis; hiatu longissimo. Long. 0·8, lat. 0·3, alt. 0·4 poll."—*Sowerby.*

Hab.—"Ad Insulas Gallapagos et apud Insulam Lord Hood's dictam."—*Sowerby.*

b. Valves elongate-cuneiform.

Hiatus, equalling the whole length of the shell, apertissima, impressa, lamellosa, Rüppellii, spathulata, Stimpsonii, tenera.

" nearly the entire length of the shell, cucullata, difficilis, interrupta.

" about two-thirds the length of the shell, indistincta, Philippinensis.

13. R. apertissima, Deshayes, sp.

Gastrochæna apertissima, Deshayes, Zool. Proc. p. 326, 1854.

Rocellaria apertissima, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ elongatâ, cuneiformi, inflatâ, tenui, fragili, per totam altitudinem testâ antice inferneque hiantissimâ, albâ, tenui, pellucidâ, anticè brevissimâ, marginè inferiorè ferè recto, posteriorè obtuso, convexo, superiore paulo obliquo; valvis tenuissimè striatis, striis in laterè antico transversalibus, in medio secundum lineam obliquam fractis, in areâ superiorè armatis, pluribus majoribus, subæquidistantibus; ligamento angusto, elongato, nigrescente."—*Deshayes.*

Hab.—Philippines. Coll. Cuming.

14. R. cucullata, Deshayes, sp.

Gastrochæna cucullata, Deshayes, Zool. Proc. p. 329, 1854.

Rocellaria cucullata, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ elongato-cuneiformi, tenui, albâ, fragili, subcretaceâ, extremitate anticâ brevissimâ, posticâ compressâ, dilatatâ, spathuliformi, antice inferneque oblique hiante, apertura lateraliter coarctata, ferè totam longitudinem testæ æquante, latere antico angusto, incumbente, cucullato; valvis extus in tres areas divisis, primâ anticâ obsolete striatâ, mediana latiore, irregulariter arcuatim striato-rugosâ, tertiâ circâ ligamentum angustiorè, lævigatâ; umbonibus tumidulis, terminalibus; ligamento satis prominulo, elongato, fusco."—*Deshayes.*

Hab.—West Indies. Coll. Cuming.

15. R. difficilis, Deshayes, sp.

Gastrochæna difficilis, Deshayes, Zool. Proc. Lond. p. 328, 1854.

Rocellaria difficilis, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ elongato-transversâ, ovatâ, cuneiformi, compressiusculâ, obliquè longè hiantè, hiatu ovato-oblongo, infernè attenuato, ferè totam longitudinem testæ æquante; valvis, trapezoidalibus, tenuè striatis; striis tenuissimis, erectis, angustissimis, in laterè antico con ertioribus; umbonibus minimis; laterè antico brevissimo, recto; ligamento elongato, rufo, angusto."—*Deshayes.*

Hab.—Western India. Coll. Cuming.

16. R. impressa, Deshayes, sp.

Gastrochæna impressa, Deshayes, Zool. Proc. p. 327, 1854.

Rocellaria impressa, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ elongato-cuneiformi, subovatâ, inflatâ, antice infernequè amplissimè apertâ; hiatu totam longitudinem testæ æquante, margine lateraliter oblique arcuato, anticè angusto; valvis tenuibus, subtrapezoidalibus, in medio sulco vix impresso bipartitis, partè anticâ tenuè transversim striatâ, striis in sulco subfractis, partè posticâ arcuatim et irregulariter sulcato-striatâ, in laterè postico striis oblique ascendentibus; umbonibus tumidulis, posticè obtusè subangulatis, ferè terminalibus; ligamento angustissime, elongato, partim immerso."—*Deshayes.*

Hab. ———? Coll. Cuming.

17. R. indistincta, Deshayes, sp.

Gastrochæna indistincta, Deshayes, Zool. Proc. p. 328, 1854.

Rocellaria indistincta, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ ovato-elongatâ, angustâ, cuneiformi, tenui, albâ, oblique truncatâ, elongato-hiantè, hiatu elongato, acuminato, angusciusculo, usque ad tertiam partem posticam testæ attingente, transversim striatâ, striis anticè tenuibus, regularibus, sublamellosis, erectis, in medio paulo distantioribus, et minus regularibus in areâ posticâ tenuissimis; areâ posticâ elongato-angustâ, angulo obtuso-distinctâ; laterè antico brevissimo, ligamento angustissimo, partim infosso, breviusculo."—*Deshayes.*

Hab.—Singapore. Coll. Cuming.

18. R. interrupta, Deshayes, sp.

Gastrochæna interrupta, Deshayes, Zool. Proc. p. 329, 1854.

Rocellaria interrupta, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ elongato-angustâ, convexiusculâ, extremitatibus ferè æqualiter latâ, per longitudinem quasi excisâ, latè apertâ; hiatu longissimo, ovato, oblongo, inferne vix acuto, et fere totam longitudinem testæ æquante; valvis oculo nudo lævigatis, sublentè argutissime striatis, striis obsoletis, distantibus, incrementi distantibus, subcontabulatis, interruptis; marginè inferiorè recto, superiorè fere parallelo, umbonibus minimis, subterminalibus; laterè antico brevi, inclinato; ligamento angustissimo, brevi."—*Deshayes.*

Hab.—Philippines. Coll. Cuming.

19. R. lamellosa, Deshayes, sp.

Gastrochæna lamellosa, Deshayes, Zool. Proc. p. 328, 1854.

Rocellaria lamellosa, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ elongato-angustâ, tenui, fragili, candidâ, hyalina, compressiusculâ, longè hiante, margine antice paululam excavato, in medio convexo, hiatu longissimo, inferne valdè attenuata, ferè totam altitudinem testæ æquante; valvis anticè valdè attenuatis, rostratis, posticè obtusis, rotundatis, anticè tenuissimè striatis, striis erectis, appressis, in medio distantioribus, breviter lamellosis, eleganter armatis, regularibus; umbonibus minimis, approximatis, subumbilicatis; laterè antico brevissimo, subrostrato; ligamento angustissimo, nigro."—*Deshayes.*

Hab.—Philippines, Zebu. Coll. Cuming.

20. R. Philippinensis, Deshayes, sp.

Gastrochæna Philippinensis, Deshayes, Zool. Proc. Lond. p. 328, 1854.

Rocellaria Philippinensis, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ elongato-angustâ, subovatâ, compressiusculâ, tenui, albâ, anticè inferneque obliquè hiantè, hiatu ovato, infernè acuminato, dimidiam partem testæ paulo superantè; valvis tenuè striato-lamellosis; striis arcuatis, secundum peripheriam valvarum anticè tenuibus, approximatis, in medio latioribus, sublamellosis; marginè superiorè postico paulo carinato; umbonibus minimis; laterè antico brevi, recto, subrostrato."—*Deshayes.*

Hab.—Philippines, Zebu. Coll. Cuming.

21. R. Ruppellii, Deshayes, sp.

Gastrochæna Ruppellii, Deshayes, Zool. Proc. Lond. p. 328, 1854.

Rocellaria Ruppellii, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ elongato-ovatâ, solidulâ, turgidulâ, candidâ, anticè oblique hiante; hiatu ovato, latè, inferè attenuato, ferè totam altitudinem testæ æquante; valvis densè striatis, striis obtusis, anticè satis regularibus, appressis, in medio et laterè postico distantioribus, irregularibus, obtusis; umbonibus tumidulis; laterè antico brevi, recto, anticè parum inflexo; ligamento prælongo, angusto."—*Deshayes.*

Hab.—Red Sea. (Rüppell.) Coll. Cuming.

22. R. spathulata, Deshayes, sp.

Gastrochæna spathulata, Deshayes, Zool. Proc. p. 329, 1854.

Rocellaria spathulata, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ elongato-angustâ, cuneiformi, compressiusculâ, tenui, fragili, albâ, anticè longe hiante, hiatu fere totam longitudinem testæ æquante, inferne sensim attenuatâ; valvis anticè angustis, posticè latioribus, spathulatis, irregulariter striatis, striis lateris antici tenuioribus, magis regularibus, rectis, in medio rugulosis, arcuatis, inæqualibus, umbonibus minimis, acutis, ferè terminalibus; laterè antico brevissimo; ligamento elongato, angusto, fuscescente; sinu pallii angustissimo, acuto, profundissimo, usque umbones versus ascendente."—*Deshayes.*

Hab.—Philippines, Bohol. Coll. Cuming.

23. R. Stimpsonii, Tryon.

Description.—R. testâ elongato-angustâ, albâ, extremitate anticâ brevissimâ, acuminatâ; valvis concentrice dense striatis; umbonibus prominulis, ferè terminalibus; hiatu anguste-elongatâ, ferè totam longitudinem testæ æquante; marginè anteriorè et posteriorè fere parallelis. Long. ·62, lat. ·24, poll.

Hab.—Beaufort Harbor, N. C. Wm. Stimpson, M. D. Coll. Smithsonian Institution.

The above description is drawn up from a single valve obtained by Dr. Stimpson in the harbor of Beaufort, N. C. It is so very different from the other species of Rocellaria found on our Southern Coast and in the West Indies, that I have not hesitated in regarding it as new. The great length of the valve in proportion to its breadth, and the nearly parallel margins, distinguish it from R. ovata and R. hians. In the latter, the beaks are more nearly terminal. R. dubia of Europe, besides the above differences, has a truncated posterior end, whilst this is regularly rounded; and all the above species are much more inflated, with a wider hiatus, than in R. Stimpsonii.

The hinge exhibits small but well marked laminæ.

24. R. tenera, Deshayes, sp.

Gastrochæna tenera, Deshayes, Zool. Proc. p. 327, 1854.

Rocellaria tenera, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ elongato-angustâ, tenui, pellucidâ, compressiusculâ, anticè angustâ, posticè paulo latiorè, subdilatatâ, anticè apertissimâ, hiatu totam altitudinem æquante, lateraliter paulo sinuoso; valvis anticè inæqualiter tenuè striatis, in medio distanter arcuato-subplicatis; umbonibus tumidulis, subterminalibus; laterè antico brevi, subhorizontali, in suturâ cristato, et emarginato; sinu pallii magno, profundo, triangulari, apicè acutissimo, basi lato."—*Deshayes.*

Hab.—Philippines. Coll. Cuming.

Subgenus Spengleria.

25. R. Mytiloides,* Lamarck, sp.

Gastrochæna Mytiloides, Lam. Anim. sans Vert. v. p. 447, 1818.
" (Desh. ed.) Anim. sans Vert. vi. p. 49, 1835.
Hanley, Desc. Cat. p. 10, t. 9, f. 37, 1842.
Catlow, Conch. Nomenc. p. 2, 1845.

Rocellaria Mytiloides, H. and A. Adams, Genera, ii. p. 336, 1856.

(No name.) Rumphius, Amboinsche Rarit. t. 45, f. P, 1705.

Description.—"R. testâ ovatâ; valvis areâ longitudinali pyramidatâ distinctis; rugis transversis, fuscis."—*Lamarck.* 1½ inch long.

Hab.—Isle of France.

26. R. plicatilis, Deshayes, sp.

Gastrochæna plicatilis, Deshayes, Zool. Proc. Lond. p. 329, 1854.

Rocellaria plicatilis, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ elongato-ovatâ, tenui, fragili, pellucidâ, compressiusculâ, longè hiantè, posticè truncatâ, hiatu maximo, elongato, totam altitudinem testæ æquante, infernè sensim attenuatâ; valvis in tres areas divisis, unâ anticâ latâ, transversim regulariter striatâ, striis tenuissimis, oblique sublente striolatis, parte secunda oblique medianâ, angustâ, lævigatâ, posticâ pyramidatâ, prominentiore, sulcis depressiusculis circumdatâ, transversim profundè sulcatâ, quasi scalariformi, areâ circâ ligamentum planulatâ, elongato lanceolatâ, ligamento crasso, elongato."—*Deshayes.*

Hab.—Philippines, Zebu. Coll. Cuming.

27. R. rostrata,* Spengler, sp.

Gastrochæna rostrata, Spengler, Nov. Act. Sc. Soc. ii. 1783.

Gastrochæna callosa, Philippi, Weigmann's Archiv, 1845.

Gastrochæna Chemnitziana, D'Orbigny, Sagra's Cuba, Moll. p. 229, t. 29, f. 29, 30.

Beau, Cat. Coq. Guadaloupe, p. 27, 1858.

Rocellaria rostrata, Mörch, Catalogue, 1853.

H. and A. Adams, Genera, ii. p. 336, 1856.

Pholas hians, (partim,) Chemnitz, x. f. 1680—'81, 1788.

Description.—"R. testâ oblongo-cuneatâ, tenui, albidâ, concentricè striatâ, areâ anali longitudinali pyramidatâ, externè sulcatâ, plicis transversis rectis ornatâ; laterè anali elongatâ, transversim truncato; laterè buccali angustato, obtuso; hiatu magno. Long. 24 mill."—*D'Orbigny.*

Hab.—West Indies.

This species is distinguished from R. truncata by its large transverse lamellar ribs, their place being occupied in the latter species by coarse striæ, The anterior margin of R. rostrata is also more convex and not emarginate and the portion of the shell anterior to the umbones is wide, and not acuminate as in R. truncata.

It resembles R. mytiloides, but may be distinguished, according to D'Orbigny, by the "*côtes anales plus droites, son sillon lateral bien plus prononce, et ses stries plus regulieres.*" The specimens of the two species in the collection of the Academy, though authentic, do not exhibit sufficient distinctive characters to clear the mind from all doubt, though the probability is that they are properly separated.

28. R. truncata,* Sowerby, sp.

Gastrochæna truncata, Sowerby, Zool. Proc. Lond. p. 21, 1834.

Th. Müller, Syn. Test. Viv. p. 235, 1836.

Hanley, Desc. Cat. p. 10, t. 9, f. 40, 1842.

Catlow, Conch. Nomenc. p. 2, 1845.

Jay, Catalogue, 4th edit. 1850.

Carpenter, Mazatlan Shells, Brit. Mus. Cat. p. 14, 1857.

Rocellaria truncata, H. and A. Adams, Genera, ii. p. 336, 1856.

Description.—"R. testâ oblongâ, posticè rotundato-truncatâ, striatâ, sordidè albicantè; epidermidè tenui lamellosâ, posticè tectâ; laterè antico brevissimo, subacuminato. Long. 1·4, lat. 0·7, alt. 0·7, poll."—*Sowerby.*

Hab.—In Sinu Panamensi, (Isle of Perico.) Found in Spondyli.

This is a very distinct species, and is well authenticated both by the numerous specimens existing in cabinets, and by Mr. Carpenter's excellent description. The original diagnosis by Sowerby is rather meagre, though much better than several others by this author. The hinge is armed with a distinct spathulate lamina.

CUCURBITULA.

C. cymbia,* Spengler, sp.

Gastrochæna cybium, Spengler, Nov. Act. Sc. Soc. ii. 1783.
Fistulana lagenula, Lamarck, Anim. Sans Vert. v. p. 436. 1818.
" (Desh. ed.) Anim. sans Vert. vi. p. 31, 1835.
Bosc, Hist. des Coq. ii. p. 205, 1824.
Hanley, Desc. Cat. p. 3, t. 13, f. 59, 1842.
Catlow, Conch. Nomenc. p. 2, 1845.
Cucurbitula lagenula, Gould, Boston Proc. viii. p. 22, 1861.

Description.—"C. nanâ, laterè affixâ; vaginâ lagenœformi, segmentis transversis articulatâ."—*Lamarck.*

"T. elongatâ, arcuatâ, tenuis, lacteâ, posticè quadrangularis, anticè declivis, et in rostrum protractâ; umbonibus ventricosis ad quadrantem anticalem positis; marginè dorsali posticâ rectâ; marginè ventrali incurvatâ; angulis posticis rotundatis; fascie dorsali latè ovato-cuneatâ, posticè cito angustatâ; fascie ventrali ovatâ, omnino hiante. Long. 12; lat. 6; alt. 3 millim."—*Gould.*

Hab.—"Inhabits Hong Kong Harbor, 10 fathoms, Shelly Sand." W. Stimpson. "Red Sea;" label of specimen, from G. B. Sowerby, in Coll. A. N. S.

The tube of this species is a well known object in Conchological Collections; it is strange that the valves were never described until this year. It is widely distributed as a fossil species, and, had we included its synonymy, as such, the list would extend to a page or more. Although the descriptions by the older writers are sufficiently comprehensive for a perfect recognition of the species by its tube alone, still it is very questionable, whether, considering that Dr. Gould was the first to describe the entire Mollusk, the credit should not be given to him for the species.

BRYOPA.

1. B. aperta,* Sowerby, sp.

Clavagella aperta, Sowerby, Genera, No. 13, f. 1, 2, 3, 4, 1820–24.
Crouch, Introd. Lamarck, t. 2, f. 7, *a*, *b*, 1827.
Deshayes, Encyc. Meth. Vers. ii. p. 240, 1830.
" Lamarck, Anim. sans Vert. 2 edit. vi. p. 25. 1835.
Deshayes, Expl. Sci. de l'Algerie, Moll. p. 15, t. 1, f. 1.
Cuvier, Regne, Anim. (Audouin's Ed.) Moll. t. 117, f. 2.
Reeve, Conch. Syst. i. p. 35, t. 18, 1841.
Hanley, Desc. Cat. p. 2, t. 9, f. 21, 1842.
Cailliaud, Guerin's Mag. Zool. 1842, t. 49, f. 1–7, t. 50, f. 1 and 2, t. 51, f. 1–4.
Cailliaud, Chenu's Ill. Conch. Clavagella, p. 4, t. 1, f. 3–6.
Catlow, Conch. Nomenc. p. 2, 1845.
H. and A. Adams, Genera, iii. t. xci. f. 3, *a*, *b*, *c*, 1856.
Gray, Figs, Moll. Anim. v. t. 340 f. 6, 7, 8, 1857.
Clavagella vivens? Rang, Man. Moll. p. 342, 1829.
Clavagella sicula, Dellachiaje Anim. Sans Vert. t. 83, f. 19 and 23, t. 84, f. 18, 22, 23.
Bryopa aperta, Gray, Zool. Proc. p. 314, 1858.
H. and A. Adams, Genera, ii. p. 649, 1858.

Description.—"B. excavatio ovatâ, rotundâ, superascensâ; tubo cum limbis; valvis subtriangularibus, ovatis, maximè oscilatis, concavis, rugosis, margaritaceis intus; umbone subrotundato."—*Cailliaud.*

Hab.—Mediterranean Sea.

A very complete account of this species is given in Cailliaud's Monograph, contained in Guerin's Magazine. M. Calliaud considers the following species (B. l a t a) a synonym: not being entirely satisfied that such is the case, I have not united them under one description. A full anatomical description, splendidly illustrated, is contained in Deshayes' Mollusca of the Exploration of Algeria.

2. B. l a t a, Broderip, sp.
Clavagella lata, Broderip, Zool. Proc. p. 111, 1834.
" " Trans. 1, p. 265, t. 30, f. 8–10, 1835.
Owen, (Anatomy,) Trans. 1, p. 267, t. 3, f. 11–16, 1835.
Müller, Syn. Test. Viv. p. 240, 1836.
Hanley, Desc. Cat. p. 2, t. 11, f. 4, 1842.
Deshayes, Traite, Elem. p. 25, t. 1, f. 12–14, 1843-50.
Cailliaud, Chenu, Illus. Conch. p. 5, t. 3, f. 7.
Catlow, Conch. Nomenc. p. 2, 1845.
H. and A. Adams, Genera, ii. p. 338, 1856.
Bryopa lata, " " " ii. p. 649, 1858.
Gray, Zool. Proc. p. 315, 1858.

Description.—"B. camerâ rotundato-ovatâ, valvâ liberâ, latiusculâ, subtrigonâ, subconvexâ, externâ concentricè rugosâ, intus nitente; umbone subrotundato."—*Broderip.*

Hab.—Indian Ocean, Pacific.

3. B. M e l i t e n s i s, Broderip, sp.
Clavagella Melitensis, Broderip, Zool. Proc. p. 116, 1834.
" " Trans. i. p. 265, t. 35, f. 5–8, 1835.
Müller, Syn. Test. Viv. p. 240, 1836.
Cuvier, Regne Anim. (Audouin's edit.) t. 117, f. 1, *a*, *b*, *c*, *d*.
Hanley, Desc. Cat. p. 2, t. 11, f. 3, 1842.
Cailliaud, Guerin's Mag. Zool. t. 50, f. 4, 1842.
" Ill. Conch. Chenu, Clavagella, p. 4, t. 1, f. 5, and t. 3, f. 1–6.
Forbes, Rep. Ægean Invert. p. 142, 1843.
Deshayes, Expl. Sci. de l'Algerie, Moll. p. 14, t. 1, f. 2.
Catlow, Conch. Nomenc. p. 2, 1845.
H. and A. Adams, Genera, ii. p. 338, 1856.
Gray, Figs, Moll. Anim. v. t. 340, f. 9, and t. 341, f. 1, 1857.
Clavagella angulata, Philippi, Enum. Moll. Sicil. ii. p. 2, t. 13, f. 3, 1844.
Bryopa Melitensis, H. and A. Adams, Genera, ii. p. 649, 1858.

Description.—"Testâ subrotundatâ, convexâ, rugosâ, intus subnitens; tubo longitudinaliter corrugate."—*Broderip.*

Hab.—Greece, Venice, Malta, Sicily.

Dr. J. E. Gray, in Proc. Zool. Soc. 1858, writes this as a synonym to B. a p e r t a. I have followed Deshayes and Cailliaud in considering it distinct. Deshayes has detected differences in the animals of the two species, and the shells may be readily separated by the differences in shape of the valves, which appear to be permanent.

Subgenus Dacosta.

4. B. A u s t r a l i s,* Sowerby, sp.
Clavagella Australis, Sowerby, Stuchbury Cat. App. t. 1, f. 1.
Hanley, Desc. Cat. p. 2, t. 9, f. 22, 1842.
H. and A. Adams, Genera, ii. p. 338, iii. t. xci. f. *a*, *b*, *c*, 1856.

Bryopa (S. G. Dacosta,) Australis, H. and A. Adams, Genera, ii. p. 649, 1858.
Dacosta Australis, Gray, Zool. Proc. p. 315, 1858.
Clavagella elongata, Broderip, Zool. Proc. p. 116, 1834.
" " Trans. i. p. 265, t. 35, f. 1–4, 1835.
Müller, Syn. Test. Viv. p. 240, 1836.
Hanley, Desc. Cat. p. 2. t. 11, f. 1, 2, 1842.
Cailliaud, Guerin's Mag. Zool. p. 17, t. 50, f. 3, 1842.
" Chenu, Illust. Conch. Clavagella, p. 4, t. 1, f. 4.
Catlow, Conch. Nomenc. p. 2, 1845.
H. and A. Adams, Genera, ii. p. 338, 1856.
Bryopa elongata " " " " p. 649, 1858.

Description.—"B. camerâ elongato-ovatâ; valva liberâ elongatâ, subtrigonâ, convexâ, externè concentricè valdè rugosâ, intus nitente; umbone acuto."—*Broderip.*

Hab.—Pacific.

I agree with Dr. Gray in uniting *B. elongata* with B. Australis, a comparison of the descriptions and figures of the two species demonstrates their entire identity.

5. B. balanorum, Scacchi, sp.
Clavagella balanorum, Scacchi, Mss. Philippi, Weigman's Archiv für naturg. i. p. 181, t. 3, f. 1–6, 1340.
Cailliaud, Guerin's Mag. Zool. p. 16, t. 52, f. 1–5, 1842.
Cailliaud, Chenu's Ill. Conch. Clavagella, p. 4, t. 1, f. 7.
Hanley, Desc. Cat. p. 2, t. 10, f. 21, 1842.
Philippi, Enum. Moll. Sicil. ii. p. 1, t. 13, f. 2, 1844.
Catlow, Conch. Nomenc. p. 2, 1845.
Gray's Figs, Moll Anim. v. t. 340, f. 1–5, 1857.
H. and A. Adams, Genera, ii. p. 338, 1856.
Bryopa balanorum, " " " " p. 649, 1858.

Description.—"B. testâ bivalvis in conceptaculo ovali, rotundatâ; conceptaculum ipsum in fistulam subtetragonam productum; valvæ subtrigoniæ, rugosæ."—*Cailliaud.*

Hab.—Naples.

I have strong doubts respecting the distinctness of this species from B. aperta. The shell is uniformly smaller, and the tube short, just extending beyond the surface of the masses of Balani in which it is imbedded. Perhaps the young shell of B. aperta?

Brechites.

1. B. annulus,* Deshayes, sp.
Aspergillum annulosum, Deshayes, Mss. in Mus. Cuming.
Reeve, Monog. Asp. t. 1, f. 1, *a*, *b*, 1860.
Brechites annulus, Gray, Zool. Proc. p. 312, 1858.

Description.—"B. testâ valvis sublatè ovatis, tumidiusculis: vaginâ elongato-attenuatâ, undique undato-annulosâ; fimbriâ peramplâ, regulari, tubulis longis, minimis, confertis; disco valdè convexo, perforationibus parvis, numerosis, parum tubulosis."—*Reeve.*

Hab.—Singapore.

This species may be distinguished from B. Javanus and B. pulchrus by the annular markings on its tube. The frill is much more regular than in either of the other species.

2. B. Javanus, Lamarck, sp.

Aspergillum Javanum, Lamarck, Anim. Sans Vert. v. p. 439, 1818.
" (Desh. edit.) Anim. sans Vert. vi. p. 20, 1835.
Blainville, Malacol. p. 576, t. 81, f. 2, 1825.
Crouch, Introd. Lam. t. 2, f. 5, 6, 1827.
Cuvier, Regne Anim. (Audouin's ed.) t. 119, f. 2.
Wyatt, Conch. t. 33, f. 3, 1838.
Anton, Verzeich der Conch. p. 1, 1839.
Reichenbach, Conchylien, p. 122, 1842.
Hanley, Desc. Cat. p. 1, 1842.
Reeve, Conch. Syst. t. 17, f. 3–5, 1843.
" Monog. Asp. t. 1, f. 3, 1860.
Deshayes, Traite, Elem. i. pt. 2, p. 15, f. 1, 2, 3.
Potiez et Mich. Gallerie des Moll. ii. p. 273, 1844.
Catlow, Conch. Nomenc. p. 1, 1845.
Chenu, Ill. Conch. Asp. p. 2, t. 2, f. 1, 2.
Aspergillum Listeri, Gray, Ann. Philos. 1825.
" Zool. Proc. p. 311, 1858.
Clepsydra Javanica, Schumacher, Essai d'un, Nov. Syst. p. 261, 1817.
Penicillus Javanus, Bosc, Hist. Nat. des Moll. v. p. 154, t. 41, f. 1, 1824.
Brechites Javanus, H. and A. Adams, Genera, ii. p. 339, t. xci. f. 4*a*, 1856.
Brechites penis, Mörch, Catalogue, 1853.
Phalus testaceus, Lister, t. 548, f. 3, 1685.
Phalus marinus, Rumphius, Amboinsche, t. 41, f. 7, 1705.
Gualtieri, Test. t. 10, f. m. 1742.
Tubulus marinus, (partim) Klein, Tab. Mar. Gen. p. 20, 1753.
Martini, Conch. i. p. 42, t. 1, f. 7, 1769.
Serpula Penis, (partim) Linnæus, Gmelin.
Brooke, Conch. t. 9, f. 130, 1815.
Knorr, Vergnüg, iv. t. 28, f. 1, vi. t. 40, f. 1, 1773.
Schreibers, ii. p. 372, 1793.
Schroeter, Einleit. Conch. ii. p. 554, 1784.
Serpula aquaria (partim,) Dillwyn, Cat. p. 1083, 1817.
Mawe, Conch. t. 34, f. 3, 1823.
Wood, Index, Test. edit. 2, t. 38, f. 34, 1828.
Woodarch, Introd. t. 4, f. 61, 1831.
Serpula perforata, Shaw, Nat. Misc. vi. t. 188.
Aquaria radiata, Perry, Conch. 1811.

Description.—"B. testâ valvis sublatè ovatis, tumidiusculis ; vaginâ elongato-attenuatâ, subannulosâ ; fimbriâ amplâ, irregulari, subflexuosâ, tubulis parvis, longis, confertis, hic illic ramoso-agglomeratis ; disco valdè convexo, perforationibus numerosis, parvis, parum tubulosis."—*Reeve.*

Hab.—Java.

Aspergillum sparsum of Sowerby is sometimes quoted as a synonym of B. Javanus—it is, however, more closely allied to Brechites aquaria of Burrow, in the synonymy of which we have placed it.

Dr. Gray has named this species *B.* (*Aspergillum*) *Listeri*, alleging that the Aspergillum Javanum of Lamarck included several species ; but since the majority of conchologists have designated this shell as Lamarck's species; it does not seem necessary to adopt Dr. Gray's name at this late period.

3. B. pulchrus, Deshayes, sp.

Aspergillum pulchrum, Deshayes, Mss. in Mus. Cuming.
Reeve, Monog. Asp. t. 3, f. 13, 1860.
Gray, Zool. Proc. p. 312, 1858.

Aspergillum Javanum, var. Chenu.

Description.—"B. testâ valvis ovatis, anticè subattenuatis ; vaginâ angustâ, obscurè annulosâ ; fimbriâ perampla, profusè ramosâ, tubulis prælongis minutis, crispatis, numerosissimis, irregulariter dichotomis, disco minutè perforato, perforationibus spinoso-tubulosis."—*Reeve.*

Hab.—Singapore.

B. pulchrus is remarkable for the profusion of twisted tubuli constituting its fringe. It is a smaller shell than B. Javanus, and is apparently a good species.

Subgenus Warnea.

4. B. Australis, Chenu, sp.

Aspergillum Australe, Chenu, Illust. Conch. p. 3, t. 3, f. 1, 1*a*.
Catlow, Nomenc. p. 1, 1845.
Brechites Australis, H. and A. Adams, Genera, ii. p. 339, 1856.
Warnea Australis, Gray, Zool. Proc. p. 310, 1858.
Aspergillum Cumingianum, Chenu, Illust. Conch. p. 3, t. 3, f. 4. 4*a*.
Catlow, Conch. Nomenc. p. 1, 1845.
Reeve, Monog. Asp. Conch. Icon. t. 2, f. 7, *a*, *b*, 1860.
Brechites Cumingianus, H. and A. Adams, Genera, ii. p. 339, 1856.
Aspergillum incertum, Chenu, Illust. Conch. p. 4, t. 4, f. 5.
Catlow, Conch. Nomenc. p. 1, 1845.
Reeve, Monog. Asp. t. 4, f. 19, 1860.
Brechites incertus, H. and A. Adams, Genera, ii. p. 339, 1856.

Description.—"B. vaginâ longâ, rectâ, subclavatâ, arenas et zoophyta agglutinante ; disco plano, irregulariter fimbriato, tubulis extùs minimis et subprominulis perforate ; fissurâ profundè incisâ, limbis foleaceis infernè decoratâ ; valvis æqualibus, inclusis."—*Chenu.*

Hab.—Australia.

The three species quoted above may not be the same, but more specimens will require to be examined to prove their distinctness.

5. B. vaginiferus,* Lamarck, sp.

Aspergillum vaginiferum, Lamarck, Anim. sans Vert. v. p. 430, 1818.
" (Desh. ed.) Anim. sans Vert. vi. p. 21, 1835.
Sowerby, Genera, f. 1, 2.
Hanley, Desc. Cat. p. 1, t. 9, f. 23, 1842.
Ruppell, Atlas. Reise, Nord. Afric. t. 12, f. 2.
Savigny, Expl. Egypt, Moll. t. 14, f. 9.
Guerin, Iconog. du Reg. Anim. t. 33, f. 7.
Reeve, Conch. Syst. t. 17, f. 1, 2, 1843.
Chenu, Conch. Illust. Asp. p. 2, t. 1, f. 1, *a*, *b*, *c*, t. 4, f. 9, *a*, *b*, *c*, and t. 5, f. 1–9.
Gray, Figs. Moll. Anim. t. 341, f. 2, 1857.
Reeve, Monog. Asp. Conch. Icon. t. 1, f. 2, 1860.
Brechites vaginiferus, H. and A. Adams, Genera, ii. p. 339, iii. t. xci. f. 4, 1856.
" (S. G. Warnea,) vaginiferus, H. and A. Adams, Genera, ii. p. 649, 1858.
Warnea vaginifera, Gray, Zool. Proc. p. 339, 1858.
Aspergillum Delessertianum, Chenu, Conch. Illust. Asp. p. 3, t. 1, f. 2.
Catlow, Nomenc. p. 1, 1845.
Reeve, Monog. Asp. t. 2, f. 6, 1860.
Brechites Delessertianus, H. and A. Adams, ii. p. 339, 1856.

Description.—"B. testâ valvis oblongo-ovatis, concentricè tenuissimè lirato-

striatis, posticè angulatis; vaginâ longissimè subrectâ, arenulas agglutinante, limbo ad superam extremitatem conspicuè trifariam ad quinquefariam foliato; fimbriâ brevi, tubulis subamplis, liberis, sæpè irregularibus; disco convexo, amplo, perforationibus amplis, tumidiusculis."—*Reeve.*

Hab.—Red Sea.

There is but little doubt of the identity of *B. Delessertianus* with this species. Gray and Reeve both consider it the same. The differences in *B. Delessertianus* are not sufficient for a separation, unless the examination of a large number of specimens shall prove them to be constant.

PENICILLUS.

1. P. aquaria,* Burrow, sp.

Serpula aquaria, Burrow, Elem. p. 166, t. 22, f. 3.
Brechites aquarius, H. and A. Adams, Genera, ii. p. 339, 1856.
Penicillus aquarius, H. and A. Adams, Genera, ii. p. 649, 1858.
Gray, Zool. Proc. p. 312, 1858.
Aspergillum sparsum, Sowberby, Genera, No. 27, f. 3–5.
Penicillus sparsus. H. and A. Adams, Genera, ii. p. 649, 1858.
Aspergillum semifimbriatum, Chenu, Ill. Conch. Asp. p. 4, t. 3, f. 5.
Catlow, Conch. Nomenc. p. 1, 1845.
Reeve, Monog. Asp. t. 2, f. 5, 1860.

Serpula penis? (pars) Linnæus, Gmelin, etc.

Description.—"P. testâ valvis sublatè ovatis, posticè subangulatis, vaginâ tumidiusculâ, sæpè distortâ, infernè contractâ; fimbriâ suberectâ, tubulis sub-elongatis, dichotomis; disco parviusculo, perforationibus simplicibus."—*Reeve. Desc. of Semifimbriatum.*

Hab.—Red Sea.

Burrow's description of P. aquaria is entirely unsatisfactory, and he is only given credit for this species, on account of his figure, which represents it well enough.

Mr. Reeve considers *P. semifimbriata* doubtfully distinct. Dr. Gray regards it, however, as a merely distorted form of this species. The latter is undoubtedly correct, as a comparison of the figures of the two species abundantly establishes. Dr. Chenu's description is drawn up from a single specimen in the cabinet of Hugh Cuming.

2. P. dichotoma,* Chenu, sp.

Aspergillum dichotomum, Chenu, Ill. Conch. Asp. p. 3, t. 2, f. 6.
Catlow, Conch. Nomenc. p. 1, 1845.
Reeve, Monog. Aspergillum, t. 3, f. 9, 1860.
Brechites dichotomus, H. and A. Adams, ii. p. 339, 1856.
Aspergillum disjunctum, Deshayes, Mss. in Mus. Cuming.
Reeve, Monog. Asp. t. 3, f. 12, 1860.

Description.—"P. testâ valvis oblongo-ovatis, subtrapezoideis; vaginâ breviusculâ, supernè gradatim attenuatâ, sæpè distortâ, infernè subcontractâ; fimbriâ subamplâ, valdè irregulari, tubulis tenuibus elongatis promiscuè distortis et agglomeratis, sæpè dichotomis; disco parviusculo, convexo, minutè perforato."—*Reeve.*

Hab.—Singapore.

Dr. Gray considers this species to be a variety of P. aquaria, from which it constantly differs, however, in having a much more irregular frill, with the tubuli more numerous.

I have ventured, after a comparison of figures and descriptions in Reeve's Monograph, to include *P. disjuncta*, in the synonymy of this species.

3. P. radix,* Deshayes, sp.

Aspergillum radix, Deshayes, Mss. in Mus. Cuming.
Reeve, Monog. Aspergillum, t. 3. f. 11, 1860.

Penicillus radix; Gray, Zool. Proc. p. 312, 1858.

Description.—"P. testâ valvis ovatis, utrinque subangulatis; vaginâ supernè compressâ et longitudinaliter sulcatâ; infernè globoso-tumidâ, de inde angustè contractâ; fimbriâ amplâ, tubulis elongatis, confertis, parum irregularibus; disco parvo, profusè minutè perforato."—*Reeve.*

Hab.—Amboina.

Mr. Reeve does not consider this species as positively distinct, but states that Mr. Cuming possesses three specimens, all alike. Judging from the figure and description, I do not doubt its specific weight.

Subgenus Clepsydra.

4. P. strangulata, Chenu, sp.

Aspergillum strangulatum, Chenu, Illust. Conch, p. 3, t. 2, f. 4.
Catlow, Conch. Nomenc. p. 1, 1845.
Brechites strangulatus, H. and A. Adams, Genera, ii. p. 339, 1856.
Penicillus (S. G. Clepsydra) strangulatus, H. and A. Adams, ii. p. 649, 1858.
Clepsydra strangulata, Gray, Zool. Proc. p. 313, 1858.

Description.—"P. vaginâ longâ, clavatâ, variè pictâ, supernè strangulatâ; disco plano, tubulis minimis tecto; fimbriâ regulariter triplicatâ; fissurâ rectâ; valvis inæqualibus, incluso-depressis."—*Chenu.*

Hab.—N. E. Coast of Australia.

Fœgia.

1. F. agglutinans, Lamarck, sp.

Aspergillum agglutinans, Lamarck, Anim. Sans Vert. v. p. 430, 1818.
" (Desh. edit.) Anim. Sans. Vert. vi. p. 21, 1835.
Deshayes, Encyc. Meth. Vers. ii. p. 73, 1830.
Cuvier, Regne Anim. (Audouin's ed.) t. 119, f. 1.
Hanley, Desc. Cat. p. 2, t. 10, f. 19, 1842.
Catlow, Conch. Nomenc. p. 1, 1845.
Chenu, Illust. Conch. Asp. p. 2, t. 3, f. 2.
Reeve, Monog. Asp. t. 4, f. 18, 1860.
Brechites agglutinans, H. and A. Adams, Genera, ii. p. 339, 1856.
Fœgia agglutinans, " " " ii. p. 650, 1858.
Gray, Proc. Zool. Soc. p. 313, 1858.
Aspergillum Nova Zelandiæ, Lamarck, Anim. sans Vert. v. p. 430, 1818.
" (Desh. ed.) Anim. sans Vert. vi. p. 21, 1835.
Hanley, Desc. Cat. p. 2, t. 9, f. 54, 1842.
Chenu, Ill. Conch. Asp. p. 2, t. 2, f. 6, 7, 8, 9.
Catlow, Conch. Nomenc. p. 1, 1845.
Reeve, Monog. Asp. t. 4, f. 17, 1860.
Penicillus Nova Zelandiæ, Bosc. Hist. Nat. des Moll. i. p. 154, 1824.
Brechites (S. G. Fœgia,) Nova Zelandæ, H. and A. Adams, Genera, ii. p. 339, 1856.
Aspergillum Nova Hollandiæ, Chenu, Ill. Conch. Asp. p. 4, t. 4, f. 8.
Catlow, Conch. Nomenc. p. 1, 1845.
Brechites (S. G. Fœgia,) Nova Hollandiæ, H. and A. Adams, ii. p. 339, 1856.

Description.—"F. testâ valvis (obtectis); vaginâ clavatâ, arenulas, calculos, et conchas densè agglutinante; fimbriâ vix nullâ, tubulis brevissimis, subamplis, irregularibus; disco convexo, sparsim perforato, perforationibus subamplis, subpapillaribus."—*Reeve.*

Hab.—New Holland.

2. F. Zebuense, Chenu, sp.

Aspergillum Zebuense, Chenu, Ill. Conch. Asp. p. 3, t. 3, f. 3.
Catlow, Conch. Nomenc. p. 1, 1845.
Reeve, Monog. Asp. t. 3, f. 8, 1860.
Brechites Zebuensis, H. and A. Adams, ii. p. 339, 1856.
Aspergillum Philippinense, Chenu, Ill. Conch. Asp. p. 3, t. 4, f. 7.
Catlow, Conch. Nomenc. p. 1, 1845.
Reeve, Monog. Asp. t. 3, f. 10, 1860.
Brechites Philippinensis, H. and A. Adams, Genera, ii. p. 339, 1856.

Description.—"E. testâ valvis oblongo-ovatis, posticè subexpansis; vaginâ arenulas agglutinante, supernè subattenuatâ, utrinque longitudinaliter sulcatâ, infernè abruptè contractâ; fimbriâ sub-irregulari, tubulis distinctis liberis; disco parvo, perforationibus perpaucis, tubulosis."—*Reeve.*

Hab.—Zebu, Philippines. Mus. Cuming.

This, and the preceding, may prove to be one species; it is distinguished from F. agglutinans, principally by the much larger number of tubes on its disk, and by the larger size of its tube.

Subgenus Arytene.

3. F. Recluziana, Chenu, sp.

Aspergillum Recluzianum, Chenu, Ill. Conch. Asp. p. 4, t. 4, f. 1, 1*a*.
Catlow, Conch. Nomenc. p. 1, 1845.
Brechites Recluzianus, H. and A. Adams, Genera, ii. p. 339, 1856.
Aspergillum incrassatum, Chenu, Ill. Conch. Asp. p. 4, t. 4, f. 2.
Catlow, Conch. Nomenc. p. 1, 1845.
Reeve, Monog. Asp. t. 4, f. 15, 1860.
Brechites incrassatus, H. and A. Adams, Genera, ii. p. 339, 1856.

Description.—"F. testâ valvis oblongo-ovatis, vaginæ prolatione bifurcatâ partim indutis; vaginâ mediocri, subcontortâ, calculos parvos sparsim agglutinante; fimbriâ plus minus irregulariter distorta, tubulis hic illic dichotomis; disco parvo, perforationibus paucis, valdè irregularibus."—*Reeve.*

Hab.—?

Dr. Gray considers F. Recluziana a variety of the following species, F. tuberculata; the tubuli in the latter are, however, very regular, and but little spread out, showing a marked contrast to the rather irregular fringe of this pecies.

Mr. Reeve quotes F. Recluziana as a synonym of *F. incrassata*, in which he is incorrect, for the former having a prior place and figure in Chenu's Monograph, must, of course, be retained as the name of the species.

4. F. tuberculata, Chenu, sp.

Aspergillum tuberculatum, Chenu, Ill. Conch. Asp. p. 3, t. 2, f. 3.
Catlow, Conch. Nomenc. p. 1, 1845.
Reeve, Monog. Asp. t. 3, f. 16, 1860.
Brechites tuberculatus, H. and A. Adams, Genera, ii. p. 339, 1856.
Fœgia (S. G. Arytene,) tuberculatum, H. and A. Adams, Genera, ii. p. 650, 1858.
Arytene tuberculata, Gray, Zool. Proc. p. 313, 1858.
Aspergillum ornatum, Chenu, Ill. Conch. Asp. t. 4, f. 3.
Catlow, Conch. Nomenc. p. 1, 1845.
Brechites ornatus, H. and A. Adams, Genera, ii. p. 339, 1856.
Aspergillum clavatum, Chenu, Ill. Conch. Asp. p. 4, t. 4, f. 4.
Catlow, Conch. Nomenc. p. 1, 1845.
Reeve, Monog. Asp. t. 4, f. 14, 1860.
Brechites clavatus, H. and A. Adams, Genera, ii. p. 339, 1856.

Description.—"F. testâ valvis ovatis, vaginæ prolatione bifurcatâ partim indutis; vaginâ attenuatâ, subcurvatâ arenulas calculosque parvos aggluti-

nante; fimbriâ regulariter declivi, contractâ, tubulis subelongatis, confertis, hic illic dichotomis; disco parvo, perforationibus paucis, valdè irregularibus."—*Reeve.*

Hab.—Moluccas.

HUMPHREYIA.

1. H. Strangei, A. Adams, sp.

Aspergillum Strangei, A. Adams, Zool. Proc. p. 91, 1852.
Reeve, Monog. Asp. t. 2, f. 4, 1860.
Brechites Strangei, H. and A. Adams, Genera, ii. p. 339, 1856.
Humphreyia Strangei, H. and A. Adams, Genera, ii. p. 650, 1858.
Gray, Zool. Proc. p. 317, 1858.

Description.—"H. testâ adhærente, fuscescente-carneo tinctâ, valvis subquadrato-ovatis, posticè latioribus, subangulari-expansis; vaginâ brevi, distortâ, quadrato-rotundatâ, ad angulas quatuor obtusè carinatâ; fimbriâ discoque lateraliter compressissimè distortis, perforationibus perpaucis, irregulater sparcis, parum tubulosis."—*Reeve.*

Hab.—Sydney Bay, Australia.

From Proceedings of the Academy of Natural Sciences of Philadelphia. April, 1862.

On the Classification and Synonymy of the recent species of PHOLADIDÆ.

BY GEORGE W. TRYON, JR.

In the year 1851, Dr. John Edward Gray proposed a very excellent arrangement of the genera of shells included by earlier conchologists in PHOLAS and TEREDO.* This arrangement has received the approval of most of the subsequent authors, who have treated on the subject, including Fischer, (Journ. Conchyl., 2d ser., iii. iv.), H. and A. Adams, (Genera of Recent Mollusca,) and Chenu, (Manuel, tome 2.)

S. P. Woodward, however, in his admirable Treatise on Conchology, part second, makes the following disposition of the Pholades:

Genus PHOLAS (including DACTYLINA, BARNEA, TALONA, etc.

"The differences in the dorsal shields are only of specific value."

Genus PHOLADIDEA, subgenera MARTESIA, JOUANNETIA, PARAPHOLAS.

Genus XYLOPHAGA.

Mr. P. P. Carpenter, in his various works on the West Coast Mollusca, follows Woodward's arrangement.

The only other modern classification of the family with which I am acquainted, is that contained in Swainson's Malacology, which is as follows:

Order *DITHYRA.*

Tribe MACROTRACHIÆ.

Family *PHOLIDÆ.*

Genera ASPERGILLUM, CLAVAGELLA, FISTULANA, GASTROCHÆNA, PHOLADOMYA, PHOLAS, PHOLIDÆA, MARTESIA, XYLOPHAGA, TEREDO, TEREDINA.

I am much inclined to think that more than merely specific value should be attached to the number, form and position of the accessory valves, and I have therefore adhered in the main to Dr. Gray's arrangement.

The Pholades are monographed by Sowerby, Thes. Conch., ii. 1849. Chenu, Ill. Conchyl.; and Hanley, Desc. Cat., besides which, scattered descriptions are contained in the works of numerous ancient and modern authors.

For very full and satisfactory anatomical descriptions of the animals of PHOLADIDÆ, see

Poli. Testacea utriusque Siciliæ.

Deshayes. Exploration Scientifique de l'Algerie. Mollusques.

Fischer. Journal de Conch. 2d ser., vols. iii. and iv.

The Pholades inhabit all parts of the world, and many of the species have a geographical range much surpassing that of the generality of bivalve mollusca; and the supporters of the theory of the specific distinctness of all

* An Attempt to Arrange the Species of PHOLADIDÆ into Natural Groups, by J. E. Gray, Ann. and Mag. Nat. Hist., 2d ser., viii. p. 380, 1851.

the Mollusca of the Pacific coast of America from that of the Atlantic, must admit that in this family, at least, no such barrier exists. This wide distribution has doubtless been caused, in a great degree, by the circumstances of habitation of several of the species, which seem to select floating timber for their abode. In these habitations they appear to sustain those vicissitudes of temperature which so generally circumscribe the Marine Testacea, except deep-sea species, to restricted zones of latitude; but it is exceedingly surprising that the larger species, which naturally make their abode in stone or mud, do not appear to be any more restricted in habitat than the others. In illustration of this subject, the following species and their range are cited:

Pholas costata, L. New Bedford, Mass. Mexico. Mediterranean.

Pholas truncata, Say. Atlantic coast from Nova Scotia to Florida. Peru. Chili.

Zirphæa crispata, L. Europe. United States. West coast (teste Carpenter.)

Martesia striata, L. Europe. West Indies. Philippine Islands.

The manner in which the animals of Pholas excavate the holes in rocks, wood and hard clay, in which they reside, has long proved a puzzling question to naturalists, and various theories have been started in explanation. The hypothesis of the evolution of an acid or solvent to eat away the surface of limestone rocks, was met with the powerful objection that the delicate valves of the animal itself would be equally liable to attack, and when it was found that the Pholas, not restricting its operations to carbonate of lime, excavated with equal facility surfaces on which acid has no effect,—gneiss, for instance,—the "solvent theory" received its death-blow. The use of the valves with their sharp imbrications in effecting the work of excavation is forbidden by their frequently perfect state, even when contained in the hardest substances;—(exemplified by a piece of extremely hard gneissic rock from the coast of France, containing a magnificent specimen of Dactylina dactylus, with its imbricated ribs sharp and perfect. Coll. Acad. Nat. Sci.)

The anterior part of the animal of Pholas has a granulated surface, caused by the presence of numerous siliceous particles; and this is probably the instrument which the animal employs in its work. Recent investigations have shown that these granules are renewed as fast as they are worn off by attrition with the surrounding surface, thus forming an analogy with the tongue of the Gasteropoda. The young shells of Pholadidæ frequently differ much from the adult, and this difference has caused the description of many of these as distinct species; the synonymy of the family is further confused by the redescription of species procured from stations far distant from the original localities.

Dr. Gray includes in the family Pholadidæ, three subfamilies, which are thus characterized:—

1. Pholadinæ. Dorsal muscle attached by one or two dorsal shelly valves. Cavity in which the animal lives not lined with a regular shelly tube enclosing the valves.

2. Zirphæina. Dorsal muscles only covered with a horny or coriaceous epidermis. The cavity in which they live not lined with a regular shelly tube enclosing the valves.

3. Teredinina. Dorsal muscles covered with a coriaceous epidermis. Cavity in which they live lined with a regular shelly tube surrounding the valves.

The great differences between Pholas and Teredo (strengthened by Dr. Gray's recent discoveries respecting T. giganteus) have induced me to separate them into distinct families, one containing two, the other three subfamilies, as follows.

Order *PHOLADACEA.*

Family *PHOLADIDÆ.*

Animal clavate, with a large truncated foot protruded through the otherwise closed mantle; siphons elongated, connected nearly to their ends, and not provided with shelly styles. Gills narrow, attached, closing the branchial chamber; palpi elongate.

Shell always present, its valves generally protected by one or more accessory dorsal plates.

Inhabiting excavations in wood or stone, the walls of which are sometimes, but not frequently, lined with a testaceous deposit.

Subfamily 1. PHOLADINÆ. The valves with a gap anteriorly, which is never closed in the adult shell.

Subfamily 2. JOUANNETINÆ. Anterior ventral hiatus open in the young shell, but invariably closed in the adult by a callous plate.

Family *TEREDIDÆ.*

Animal elongate, subcylindrical, siphons united nearly to the end, their extremities armed with two shelly styles; foot long and narrow, protruded through the united mantle lobes, which are thickened in front. Gills long; mouth with palpi. Shell, when present, globular, tripartite, included with the animal in a more or less cylindrical testaceous tube, the siphonal end of which is divided into two by a longitudinal partition.

Subfamily 1. TEREDINÆ. Valves present, free, contained in the tube, which is irregularly cylindrical, sometimes much contorted. Perforating timber.

Subfamily 2. TEREDININÆ. Valves with an accessory anterior dorsal plate; their margins prolonged into a shelly tube when adult. Tube frequently concamerated; siphonal extremity often truncate, and the opening contracted by a six-lobed internal margin, (*fossil.*)

Subfamily 3. KUPHINÆ. Without valves. Tube clavately cylindrical, sunk horizontally in sand. Never penetrating timber.

The present paper will comprise the family Pholadidæ as here limited, while Teredidæ will form the subject of a future article.

Synopsis of Genera.

Subfamily PHOLADINÆ.

Anterior hiatus always open.

* *With two dorsal accessory valves.*

Dorsal valves placed anterior and posterior to the beaks, the anterior lanceolate, the posterior small, transverse. Umbonal processes reflected over the beaks, closely applied. Shell elongate.....Genus PHOLAS, Linn.

Dorsal valves lanceolate, placed side by side. Umbonal processes reflexed over the beaks, cellular beneath. Shell oblong, ovate.....Genus DACTYLINA, Gray.

Dorsal valves half ovate, diverging, small. Umbonal processes none, but the anterior margins of the valves reflexed. Shell globose.....Genus XYLOPHAGA, Turton.

Dorsal valves moderate, diverging; anterior hiatus small. Shell oblong-ovate, with a pair of siphonal valves at their posterior end.....Genus TALONA, Gray.

*** With a single accessory valve.*

Dorsal valve lanceolate; umbonal processes reflexed, closely applied. Shell oblong-ovate.....Genus BARNEA, Leach.

Dorsal valve ovate-cuneiform; umbonal processes reflexed, cellular beneath. Shell oblong-ovate.....Genus MONOTHYRA, Tryon.

Dorsal valve small, transverse, posterior, under a coriaceous epidermis. Hinge plates produced and reflexed. Shell ovate.....Genus NAVEA, Gray.

**** Destitute of accessory valves.*

Beaks protected by a membrane. Valves ovate...Genus ZIRPHÆA, Leach.

Subfamily JOUANNETINÆ.

Anterior ventral gap closed in the adult by a callous plate.

** With three dorsal accessory valves.*

Anterior dorsal plates two, placed side by side, posterior to which is a central plate, directly over the umbones. Base of the siphons protected by reflected appendages.....Genus PENITELLA, Valenciennes.

*** With two dorsal accessory valves.*

Dorsal valves small. The base of the siphons protected in the adult by a subtestaceous cup-shaped appendage, which is absent in young individuals. Valves ovate.....Genus PHOLADIDEA, Turton.

Surface impressed by two oblique sulci, extending from the beaks to the margins. Shell ovate-oblong. Valves equal.....Genus PARAPHOLAS, Conrad.

**** With a single accessory valve.*

Shell globose, hinge plates not reflexed; inequivalve, the left valve overlapping the right.....Genus JOUANNETIA, Desmoulins.

Shell ovate-oblong, accessory valve lanceolate or peltate. Equivalve; the surface impressed by one or more furrows.....Genus MARTESIA, Leach.

Index to the species of PHOLADIDÆ.

Anchomasa Pennantiana, Leach = Barnea parva, Penn.
Barnea Australasiæ, Gray.
" Bakeri, Desh.= B. Burmanica?
" Burmanica, Philippi.
" candida, Linn.
" Erythræa, Gray.
" *fragilis*, Sowb. = Manillensis, Philippi.
" lanceolata, D'Orb.
" Manillensis, Philippi.
" parva, Pennant.
" similis, Gray.
" subtruncata, Sowb.
Cadmusia Solanderiana, Leach = Pholadidea papyracea, Soland.
Dactylina Campechensis, Gmel.
" " Gray,=D. Chiloensis (part.)
Dactylina *candeana*, D'Orb. = D. Campechensis.
" Chiloensis, King.
" dactylus, Linn.
" *orientalis*, Gmel.= Monothyra orientalis, Gm.
Jouannetia Cumingii, Sowb.
" *Darwinii*, Sowb.= Penitella penita.
" globosa, Quoy.
" *globulosa*, Quoy=J. globosa.
" pectinata, Conrad.
" *pulcherrima*, Sowb.= J. pectinata.
Martesia *acuminata*, Sowb. = M. calva.
" aperta, Sowb.
" Australis, Gray.
" branchiata, Gould.
" *Californica*, Conr. = Parapholas Californica.

Martesia calva, Sowb.
" *clavata*, Lam. = M. striata.
" corticaria, Adams.
" cuneifornis, Say.
" curta, Sowb.
" intercalata, Carpenter.
" multistriata, Sowb.
" obtecta, Sowb.
" ovum, Gray,
" rivicola, Sowb.
" striata, Linn.
Monothyra orientalis, Gmelin.
Mya crispata, Linn. = Zirphæa crispata.
Navea nucifera, Fabr.
" subglobosa, Gray.
" tenuis, Gray.
Parapholas *acuminata*, Sowb. = Martesia calva.
" *bisulcata*, Conr. = Martesia calva.
" Californica, Conrad.
" *calva*, Sow.=Martesia calva.
" *concamerata*, Desh. = Penitella penita.
" *Janelli*, Desh.=P. Californica.
" *ovoidea*, Gld. = Pholadidea ovoidea.
" *penita*, Conr. = Penitella penita.
" quadrizonalis, Spengl.
Penitella *Conradi*, Val. = P. penita.
" penita, Conrad.
" *Wilsonii*, Conr. = Pholadidea melanura.
Pholadidea *cuneiformis*, Say = Martesia cuneiformis.
" *curta*, Sow.=Martesia curta.
" *Goodallii*, Blain. = P. papyracea.
" *loscombia*, Turt. = P. papyracea.
" melanura, Sowb.
" ovoidea, Gould.
" papyracea, Solander.
" *penita*, Conr. = Penitella penita.
" quadra, Sowb.
" spathulata, Sowb.
" sulcata, Brown.
" tridens, Gray.
" tubifera, Sowb.
Pholadopsis pectinata, Conr.=Jouannetia pectinata.
Pholas *acuminata*, Sowerb. = Martesia calva.
" *angustius*, Petiver. = Dactylina dactylus.
Pholas *antipodum*, Phil. = Barnea similis.
" *aperta*, Sowb.=Martesia aperta
" *Australasiæ*, Gray, = Barnea Australasiæ.
" Bakeri, Desh, = Barnea Burmanica?
" *Beauiana*, Recluz. = Mart. corticaria, Ad.
" *bifrons*, Da Costa, = Zirphæa crispata.
" *Birmanica*, Phil. = Barnea Burmanica.
" *branchiata*, Gould. = Martesia branchiata.
" *Californica*, Conr.= Parapholas Californica.
" *callosa*, Lam. = Dactylina dactylus.
" *calva*, Sowb. = Martesia calva.
" *Campechensis*, Gmel.=Dactylina Campechensis.
" *Candeana*, D'Orb. = Dactilina Campechensis.
" *candida*, Chemn. = Talona explanata.
" *candida*, Linn.=Barnea candida.
" *Caribaea*, D'Orb.=Martesia corticaria.
" *Chiloensis*, King, = Dactylina Chiloensis.
" *clausus*, Gray, = Talona explanata.
" *clavata*, Lam.=Martesia striata.
" *concamerata*, Desh. = Penitella penita.
" *conoides*, Flem.=Mart. striata.
" *constricta*, Sowb.=Zirphæa constricta.
" *cordata*, Schröter, = Schröteria cordata.
" *cornea*, Sowb.=Penitella penita
" *corticaria*, Ad.= Martesia corticaria.
" costata, Linn.
" *crenulatus*, Spengler, = Barnea parva.
" *crispa*, Blainv. = Zirphæa crispata.
" *crispata*, Linn. = Zirphæa crispata.
" crucifera, Sowb.
" *cruciger*, Sowb. = P. crucifera.
" *cucullata*, Gray,= Penitella penita.
" *cuneiformis*, Say,= Martesia cuneiformis.
" *curta*, Sowb. = Martesia curta.

Pholas *dactyloides*, Della Chiaje,= Barnea candida.
" *dactyloides*, Lamarck, = Barnea parva.
" *dactylus*, Linn.=Dactylina dactylus.
" *dactylus*, Spengl. = Monothyra orientalis.
" *dactylus*, var. Deshayes, = Barnea parva.
" *Darwinii*, Sowb.=Penitella penita.
" *Edwardsii*, Gray,=Martesia cuneiformis.
" *explanata*, Spengl.= Talona explanata.
" *falcata*, Wood, = Martesia striata.
" *fragilis*, Sowb.= Barnea Manillensis.
" *gibbosa*, D'Orb. = Xylophaga globosa.
" *globulosa*, Quoy, = Jouannetia globosa.
" *hians*, Pultney,=Dactylina dactylus.
" *Hornbeckii*, D'Orb. = Martesia corticaria.
" *Incii*, Sowb.=Parapholas quadrizonalis.
" *Janelli*, Desh.=Parapholas Calif ornica.
" *Julan*, Adans.=Zirphæa Julan.
" *lamellata*, Turt. = Pholadidea papyracea.
" *lamellosa*, D'Orb.=Barnea subtruncata.
" *lanceolata*, D'Orb.=Barnea lanceolata.
" *laqueata*, Sowerby,= Dactylina Chiloensis.
" latissima, Sowb.
" *ligamentina*, Deshayes,=Barnea parva.
" *lignorum*, Spengler, = Martesia striata.
" *Manillæ*, Sowb.=Barnea Manillensis.
" *Manillensis*, Phil.=Barnea Manillensis.
" *melanura*, Sowb. = Pholadidea melanura.
" *multistriata*, Sowb. = Martesia multistriata.
" *muricata*, Da Costa,= Dactylina dactylus.
" *nana*, Pult. = Martesia striata.
" *nucifera*, Fab.=Navea nucifera.
Pholas *oblongata*, Say, = Dactylina Campechensis.
" *obtecta*, Sowb. = Martesia obtecta.
" *orientalis*, Gmel. = Monothyra orientalis.
" *ovata*, Gray, = Martesia ovum.
" *ovoidea*, Gould, = Pholadidea ovoidea.
" *ovum*, Gray, = Martesia ovum.
" *papyracea*, Spengler. = Barnea candida.
" *papyracea*, Soland.=Pholadidea papyracea.
" *parva*, Pennant,=Barnea parva.
" *parva*, Da Costa,=Zirphæa crispata.
" *patula*, Gould, = P. latissima.
" *penita*, Conr.=Penitella penita.
" *pusilla*, Linn.=Martesia striata.
" *quadra*, Sowb. = Pholadidea quadra.
" *quadrizonalis*, Spengl. = Parapholas quadrizonalis.
" *rivicola*, Sowb. = Martesia rivicola.
" *rudis*, Gray, = Martesia cuneiformis.
" *semicostata*, H. C. Lea, = Martesia striata.
" *Siamensis*, Spengl.= Monothyra orientalis.
" *silicula*, Desh.=Barnea candida.
" *similis*, Gray,=Barnea similis.
" *spathulata*, Sowb.= Pholadidea spathulata.
" *striata*, Linn.=Martesia striata.
" *striata*, Blainv.=Pholadidea papyracea.
" *subtruncata*, Sowerby = Barnea subtruncata.
" *sulcata*, Brown, = Pholadidea sulcata.
" *Terediniformis*, Sowb.=Martesia striata.
" *tridens*, Gray,= Pholadidea tridens.
" truncata, Say.
" *tuberculatus*, Turton, = Barnea parva.
" *tubifera*, Sowb. = Pholadidea tubifera.
" *Vibonensis*, Phil. = Pholadidea papyracea.
" *Xylophaga*, Desh. = Xylophaga dorsalis.
Schröteria cordata, Schröter.
Solen crispus, Gmel.=Zirphæa crispata.

Talona *clausa*, Gray,=T. explanata.
" explanata, Spengler.
Teredo dorsalis, Turton. = Xylophaga dorsalis.
Thurlosia crispata, Leach. = Zirphæa crispata.
Triomphalia Cumingii, Sowb. = Jouannetia Cumingii.
" *globosa*, Quoy,= Jouannetia globosa.
" *pulcherrima*, Sowb. = Jouannetia pectinata.
Xylophaga cardissa, Gould.
" dorsalis, Turton.
" globosa, Sowb.
Zirphæa *Beauiana*, Recluz. = Martesia corticaria.
" constricta, Sowb.
" crispata, Linn.
" *Darwinii*, Sowb. = Penitella penita.
" Julan, Adanson.
" *Vibonensis*, Philippi, = Pholadidea papyracea.

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There are but four known recent species of Pholas as now restricted, and they are very easily distinguishable from each other.

*Margins of the valves regularly rounded anteriorly.....P. costata.
**Anterior ventral margins emarginate.....Subgenus Cyrtopleura.
a. Posterior extremity of the shell not truncate.....P. crucifera.
b. Posterior extremity truncate.
Truncated end but very slightly convex in outline.....P. truncata.
Truncated end rounded, shell short and broad.....P. latissima.

P. costata, Linn., Linnæus, Syst. Nat. 1111. Adans., Genera iii. t. 89, f. 1, 1, a. Anton. Verzeich der Conch. p. 1. Blainville, Man. de Malacol. t. 79, f. 6. Born., Testacea, p. 15. Bosc. Hist. Nat. des Coq. ii. p. 195. Brug. Encyc. Meth. t. 169, f. 1, 2. Catlow., Concb. Nomenc. p. 3. Chemnitz, Conchyl. Cab. viii. t. 101, f. 863. Chenu, Man. de Conch. ii. f. 1, 2, 3. Deshayes, Encyc. vers. iii. p. 754. Deshayes, Traite Elem. i. pt. ii. t. 3, f. 10. Dekay, Mollusca New York, p. 248. Dillwyn, Desc. Cat. p. 36. D'Orbigny, Voy. Amer. Merid. Mollusques, p. 496. D'Orbigny, Mollusques, Sagra's Cuba, ii. p. 213. Favanne, Conchyl. t. 60, f. 1. Fischer, Journ. Conchyl. 2d ser. iii. p. 48. Gibbes, in Tuomey's Geol. S. Carolina. Gmelin, Syst. Nat. p. 3215. Gould, Invert. Mass. p. 27. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 381. Gualtieri, Index Test. t. 105, fig. g. Hanley, Desc. Cat. p. 6. Jay, Cat. 4th edit. p. 10. Knorr, Vergnüg. ii. t. 25, f. 4. Kurtz, Cat. Shells, N. and S. Carolina, p. 3. Lamarck, Anim. sans Vert. (Desh. Edit.) vi. p. 45. Lister, Conch. t. 434, f. 277. Mawe., Conch. t. 1, f. 4. Menke, Syn. p. 73. Mörch. Cat. p. 3. Potiez and Mich., Gallerie des Moll. ii. p. 269. Reeve, Conch. Syst. t. 23. Schröter, Einleit. Conch. iii. p. 537. Sowerby, Genera No. 23. Sowerby, Monog. Pholas. Thes. Conch. ii. p. 487, t. 102, f. 8, 9. Spengler, Skrivt. Nat. ii. p. 86. Stimpson, Shells New England, p. 25. Stimpson, Check List E, Coast Shells, No. 243. Wheatley, Cat. Shells. U. S. p. 2. Wood, Gen. Conch. t. 15, f. 1, 2. Wood, Index Test. t. 2, f. 4. Wyatt, Conch. p. 28, t. 3, f. 4.

Coll. Acad. Nat. Sci., from Georgia, Cuba, Vera Cruz. Coll. Dr. J. C. Jay. Coll. G. W. Tryon, Jr., (from Atlantic City, N. J.) Coll. Isaac Lea, LL.D.

Dr. Gould included this species in his "Invertebrata," on account of the discovery by Prof. C. B. Adams of an extensive bed of dead shells in New Bedford harbor. He subsequently announced it as living at this locality, remarking that he was not aware of its existence at any other place north of the Mexican Gulf. (Bost. Proc. ii. p. 81, 1845.)

Dr. DeKay described P. costata as a Southern shell, and no account of its occurrence north of North Carolina has been noticed, except "New York," in Jay's Catalogue. Dr. Stimpson writes to me that he has never met with this shell at any intermediate locality; therefore I am glad to announce its occurrence at Atlantic City, New Jersey, where I obtained several perfect valves on the beach, and at Cape May, New Jersey, where Dr. Leidy has procured a few specimens.

Subgenus Cyrtopleura, Tryon.

Margins of the valves emarginate anteriorly, making a short wide hiatus.

P. crucifera, Sowerby.

Pholas cruciger, Sowerby, Zool. Proc. p. 69, 1834. Catlow, Conch. Nomenc. p. 3. D'Orbigny, Voy. Amer. Merid. Moll. p. 499. Müller, Syn. Test. Viv. p. 236.

" *crucigera*, Philippi, Neüer Mollusken, iii. Pholas. t. 2, f. 4.

" *crucifera*, Adams, Panama Shells, p. 301. Adams, Genera, ii. p. 335. Chenu, Man. Conch. ii. f. 5. Fischer, Journ. Conch. 2d ser. iii. p. 48. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 381. Hanley, Desc. Cat. p. 6. Jay, Cat. 4th ed. p. 10. Sowerby, Monog. Pholas. Thes. Conch. ii. p. 489, t. 104, f. 24—26.

Coll. Acad. Nat. Sci.; St. Croix, West Indies? Panama. Coll. Dr. J. C. Jay. Coll. G. W. Tryon, Jr.

This is a very distinct species, differing from all others in the genus by the cruciform expansion of the dorsal margin.

P. truncata, Say, Journ. Acad. Nat. Sci. 1st ser. ii. p. 321. Adams, Genera, ii. p. 325. Catlow, Conch. Nomenc. p. 4. De Kay, Moll. New York, p. 248, t. 34, f. 223 *a b*. Fischer, Journ. Conch. 2d ser. iii. p. 48. Gibbes, Tuomey's Geol. S. Carolina. Gould, Proc. Bost. ii. p. 81. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 381. Hanley, Desc. Cat. p. 6, t. 9, f. 56. Jay, Cat. 4th ed. p. 10. Kurtz, Cat. Shells N. and S. Carolina, p. 3. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 488, t. 104, f. 29, 30. Stimpson, Shells New England, p. 25. Stimpson, Check List E. Coast Shells. Wheatley, Cat. Shells U. S. p. 2.

Coll. Acad. Nat. Sci.; New Bedford, Mass., Long Island Sound, S. Carolina, Payta, Peru, Chili. Coll. Dr. J. C. Jay. Coll. Isaac Lea. Coll. G. W. Tryon, Jr.

Mr. Sowerby wrongly refers for Say's description to "American Journal of Science, ii. p. 321."

So late as 1845, Dr. Gould, in announcing to the Boston Society of Natural History the occurrence of this species at New Bedford, Mass., remarked that it was the only locality north of South Carolina; it is now known to inhabit almost the entire coast.

P. truncata grows quite large on the northern coast, reaching three and a half inches, as Dr. Gould informs me, in the vicinity of Sable Island. I had some doubt respecting the locality "Chili" attached to a specimen in Coll. A. N. S. until the recent discovery, amongst a mass of rubbish, of a large bottle of shells, collected by Dr. W. S. W. Ruschenberger at Payta, Peru, which contained a number of specimens of this shell and of Dactylina Chiloensis. The west coast individuals are about the same size as our Southern specimens, which they also resemble in form, being rather longer and narrower than those from the New England States.

P. latissima, Sowerby.

P. latissima, Sowerby, Proc. Zool. Soc. 1849, p. 162. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 489, t. 103, f. 15, 16. Adams, Genera, ii. p. 325. Chenu, Man. Conchyl. ii. f. 4, 6. Fischer, Journ. Conchyl. 2d ser. iii. p. 48. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 381. Philippi, Neüer Conch. iii. Pholas, t. 2, f. 1.

P. patula, Gould, Bost. Proc. ii. p. 214, May, 1850. Gould, Moll. U. S. Expl. Exped. p. 384. Adams, Genera, ii. p. 325. Fischer, Journ. Conchyl. 2d ser. iii. p. 48. Jay, Cat. 4th ed. p. 10.

Hab.—Manilla. Philippines.

Coll. Dr. J. C. Jay.

Dr. Gould remarks, in the "Mollusca," that *P. patula* approaches, and may be identical with, Sowerby's species. The descriptions correspond, with the exception of a vertical constriction which divides the valve of *P. patula* in the middle, but which is not mentioned by Mr. Sowerby; nevertheless there *is* a slight constriction of the valve represented in Mr. Sowerby's figure. There can be no doubt of the identity of these shells.

Dr. Gould, in his text, refers to fig. 497 *a b*, which was not published, in consequence, as he informs me, of the only valve being broken while in the artist's hands.

P. l a t i s s i m a is readily distinguishable from t r u n c a t a by its posterior side being much shorter, with the edge more rounded, and by the greater thickness of the shell in proportion to its length.

Genus Dactylina, Gray.

Dactylina, Gray, Proc. Zool. Soc. p. 187, 1847. Gray, Ann. and Mag. Nat. Hist. 2 ser. viii. H. and A. Adams, Genera, ii. p. 325. Chenu, Man. Conch. ii.

Dactylus, Pliny, Hist. Nat. ix. cap. 87.

Pholas, (partim,) of authors.

There are two distinct forms of Dactylina; in the first, which I propose to consider the typical form, the nuclei of the dorsal valves are situated at their outer margins, posterior to the centre; several impressed lines radiate from the nuclei to the inner margin, dividing each valve into several subtriangular spaces. The valves are much emarginate anteriorly, forming a short, wide hiatus.

The other form may be thus characterized,—

Subgenus Gitocentrum.

Nuclei of the dorsal valves anterior, situated nearer the inner margin. Dorsal plates marked by radiating lines. Valves not emarginate anteriorly, but regularly rounded; hiatus long and narrow.

Typical Species.

D. d a c t y l u s, Linn. (species.)

Pholas d a c t y l u s, Linn. Syst. Nat. p. 1110. Linnæus, Faun. Suec. 2124. Anton, Verzeich der Conch. p. 1. Argenville, Conchyl. t. 3, f. k. m. Barbut, Gen. Verm. t. 1, f. 11. Bonanni, pt. 2, f. 25, 26. Born, Test. p. 14, t. 1, f. 7. Bosc, Hist. Nat. des Coq. ii. p. 194, t. 5, f. 1, 2, 3. Brooke, Conch. t. 1, f. 7, 8. Brown, Illust. Conch. Great Britain, p. 115, t. 49, f. 1, 2, 3. Bruguierè, Encyc. Meth. t. 168, f. 2—4. Catlow, Conch. Nomenc. p. 3. Chemnitz, Conch. Cat. viii. t. 101, f. 857. Chenu, Encyc. Hist. Nat. Moll. t. 33, f. 4, 5. DaCosta, Brit. Conch. p. 144, t. 16, f. 2. Deshayes, Encyc. Vers. iii. p. 753. Deshayes, Expl. Sci. de l'Algerie Moll. p. 107, t. 9, C. E. & G. f. 1—3. (Animal.) Dillwyn, Desc. Cat. i. p. 35. Donovan, Brit. Shells, iv. t. 118. Favanne, Conchyl. t. 60, f. *a*1. Fleming, Edinburg Encyc. vii. p. 100. Fleming, Brit. Anim. p. 457. Forbes and Hanley, Brit. Moll. i. p. 108, t. 3. Ginanni, Op. post. t. 31, f. 184, 185. Gmelin, Syst. Nat. p. 3214. Gualtieri, Test. t. 105, f. D. Hanley, Desc. Cat. p. 5. Herbst, Einl. i. p. 115, t. 26, f. 1. Jay, Cat. 4th ed. p. 10. Jonston, De exang. t. 11, f. 8, and t. 13. Karsten, Mus. Lesk. i. p. 150. Lamarck, Anim. sans Vert. v. p. 444. Lamarck, (Desh. edit.) Anim. sans Vert. vi. p. 43. Leach, Moll. Great Britain, p. 251. Lister, Conch. t. 433, f. 276. Marvye, Meth. necess. aux Marins, t. 1, f. 10. Mawe, Conch. t. 3, f. 3. Menke, Syn. Meth. p. 73. Montagu, Test. Brit. p. 20 and 528. Müller, Faun. Daun. p. 251. Murray, Fund. Testac. p. 40, t. 2, f. 3. Olivi, Zool. Adriat. p. 93. Pennant, Brit. Zool. iv. p. 76, t. 39, f. 10. Petiver, Gazoph. t. 79, f. 10. Philippi, Enum. Moll. Sicil. i. p. 3 and ii. p. 4. Plancus, de Conch. p. 33. Poli, Test. utr. Sicil. i. t. 7, f. 1—11. Poiret, Voy. en Barbarie, pt. 2, p. 11. Potiez et Michaud, Gallerie des Moll. ii. p. 268. Reaumur, Mem. de l'Acad. 1712, p. 125, t. 7, f. 1, 2. Reeve, Conch. Syst. t. 24. Reichenbach, Conchyl. p. 117, t. 725, 726. Roissy, Moll. vi. p. 438. Seba, Mus. iii. t. 16, f. 6 *a b*. Sowerby,

Genera Pholas, f. 1. Sowerby, Conch. Man. t. 2, f. 55, 55 *a*. Sowerby, Illust. Brit. Shells, t. 1, f. 8. Sowerby, Monog. Pholas. Thes. Conch. ii. p. 485, t. 102, f. 10, 11 and t. 105, f. 47. Spengler, Skrivt. Nat. ii. pt. 1, p. 85. Thompson, Rep. Irish Fauna, p. 263. Thorpe, Brit. Mar. Conch. p. 31. Wood, Gen. Conch. t. 13, f. 1—3. Wood, Index Test, t. 2, f. 1. Woodward, Manual, p. 328, f. 22. Wyatt, Conch. p. 27, t. 3, f. 3.

Dactylina dactylus, Gray, Figs. Moll. Anim. t. 237, f. 4 and t. 238, f. 7. Gray, Ann. and Mag. Nat. Hist. 2 ser. viii. p. 382. H. and A. Adams, Genera, iii. t. 89, f. 2, 2 *a b*. Chenu, Man. Conch. ii. f. 10, 11, 13. Fischer, Journ. Conchyl. 2 ser. iii. p. 49. Mörch, Cat. p. 3.

Pholas callosa, Lamarck, Anim. sans Vert. v. p. 445. Lamarck, (Desh. edit.) Anim. sans Vert. vi. p. 46. Cuvier, Reg. Anim. (edit. Croch.) t. 113, f. 1. Hanley, Desc. Cat. p. 5.

" *hians*, Pultney, Dorset. Cat. p. 26.

" *angustius*, Petiver, Gazophyl. t. 79, f. 10.

" *muricata*, DaCosta, Brit. Conch. p. 244, t. 16, f. 2.

Donax sive Dactylus, Belon, de Aquat. p. 414.

Coquille longue, Rondelet, Hist. des Poissons, p. 16.

Concha longa Rondeleti, Gesner, de Crust. p. 201.

Concha vera Plinii, Aldrovandi, de Test. p. 454.

Concha longa, Aldrovandi, de Test. p. 455, f. 1, 2, 3.

Hab.—Europe.

Coll. Acad. Nat. Sci. Coll. Isaac Lea, LL.D. Coll. Dr. J. C. Jay. Coll. Geo. W. Tryon, Jr.

Hanley (Desc. Cat. p. 5) says, "*P. oblongata*, Say, is probably this shell, although its beak and the number of accessory valves is not mentioned." Say's shell does not at all resemble D. dactylus.

P. callosa, Lam., was described from some distorted specimens of D. dactylus. I have seen several specimens in Mr. Lea's cabinet which are greatly distorted in shape, the beaks being almost central, the shell much wider than usual in proportion to its length, the posterior surface worn entirely smooth, and anteriorly deeply pitted, instead of the usual radiating ribs.

Subgenus Gitocentrum, Tryon. 1862.

D. Campechensis, Gmel. (Species.)

Pholas Campechensis, Gmelin, Syst. Nat. 3216. Catlow, Conch. Nomenc. p. 3. Hanley, Desc. Cat. p. 6, t. 9, f. 44. Jay, Cat. 4th ed. p. 10. Lister, Hist. Conch. t. 432.

Dactylina Campechensis, (part.) Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382. H. and A. Adams, Genera, ii. p. 326.

" *Campechiensis*, (part.) Fischer, Journ. Conch. 2d ser. iii. p. 49.

Pholas oblongata, Say, Journ. Acad. Nat. Sci. 1st ser. ii. p. 320. De Kay, Moll. New York, p. 248. Gibbes, in Tuomey's Geology of South Carolina. Kurtz, Cat. Shells N. and S. Carolina, p. 3. Stimpson, Check List E. Coast Shells.

" *Candeana*, D'Orbigny, Moll. Sagra's Cuba, p. 215, t. 25, f. 18, 19.

Dactylina Candeana Chenu, Manuel, ii. f. 12.

Hab.—Southern United States. West Indies.

Coll. Acad. Nat. Sci. Coll. A. A. Gould, M. D. Coll. Wm. Stimpson, M. D. Coll. Isaac Lea, LL.D.

Lister's figure of D. Campechensis represents very accurately a large individual of this species, although it is doubtfully referred by some European authors to the next species. The resemblance between this and the next shell, from Western South America, is so great that it would not be surprising if their identity should be established hereafter. The only difference is that our shell

is narrower in proportion to its length than the South American species, which has about one-third of its posterior surface free from striæ, while the striæ in the Campechensis are continued faintly over the entire posterior surface.

Pholas oblongata, Say, has been entirely overlooked by European authors, with the exception of Mr. Hanley, who has referred it doubtfully to D. dactylus. It is figured in Tuomey and Holmes' Pleiocene Fossils of S. Carolina, t. 24, f. 5.

D'Orbigny's *Pholas Candeana* is a half-grown shell of this species.

The only specimens that I have seen having the dorsal valves belongs to Mr. Isaac Lea. They are identical in form with those of D. Chiloensis.

D. Chiloensis, King. (sp.)

Pholas Chiloensis, King, Zool. Journ. v. p. 334, 1832. Gay, Hist. Nat. Chili, viii. p. 381. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 486, t. 102, f. 1, 2. Philippi, Neüer Conch. iii. t. 1, f. 4, 5. D'Orbigny, Voy. p. 498.

Dactylina Chiloensis, Chenu, Manuel, ii. f. 14, 15.

" *Campechensis*, (part.) Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382. H. and A. Adams, Genera, ii. p. 326.

" *Campechiensis*, (part.) Fischer, Journ. Conch. 2d ser. iii. p. 49.

Pholas laqueata, Sowerby, Proc. Zool. Soc. 1849. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 486, t. 103, f. 19, 20.

Hab.—Peru. Chili.

Coll. Acad. Nat. Sci. Coll. Isaac Lea, LL.D. Coll. J. C. Jay, M. D. Coll. G. W. Tryon, Jr.

Pholas laqueata of Sowerby is a mere variety of Chiloensis, differing in the greater prominence of the ribs and their arched scales.

King, in his description, refers to Molina, Hist. Nat. Chili, p. 179, as authority for the name; but as it would be preposterous to allow such an obscure and scant description as that of Molina's to remain as authority, I have thought it best to use King's name in that connection. Gmelin (Syst. Nat. p. 3217) merely copies Molina's description.

Genus Monothyra, Tryon. 1862.

Gen. Char.—Equivalve; anterior hiatus long and narrow. Accessory plate single, ovately triangular, with the base anterior and the nucleus subcentral. Hinge processes cellular beneath.

M. orientalis, Gmelin. (Species.)

Pholas orientalis, Gmelin, Syst. Nat. 3216. Bosc, Hist. Nat. ii. p. 196. Bruguiere, Encyc. Meth. t. 168, f. 10. Catlow, Conch. Nomenc. p. 4. Chemnitz, Conch. Cab. viii. t. 101, f. 860. Dillwyn, Desc. Cat. p. 36. Hanley, Desc. Cat. p. 5, t. 2, f. 2. Jay, Cat. 4th ed. p. 10. Lamarck, Anim. sans Vert. v. p. 444. Lamarck, Anim. sans Vert. (Desh. edit.) vi. p. 44. Lister, Hist. Conch. t. 431, f. 247. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 486, t. 102, f. 3, 4. Wood, Gen. Conch. t. 14, f. 1, 2. Wood, Index Test. Pholas, t. 2, f. 1.

Dactylina orientalis, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382. H. and A. Adams, Genera, ii. p. 326. Chenu, Man. Conch. ii. f. 16. Fischer, Journ. Conch. 2d ser. iii. p. 49.

Pholas Siamensis, Spengler.

" *dactylus*, Solander MSS. teste Gray.

Hab.—India.

Coll. Acad. Nat. Sci. Coll. Isaac Lea, LL.D. Coll. J. C. Jay, M. D. Coll. G. W. Tryon, Jr.

This species is placed by Sowerby, Gray and Chenu in the genus Dactylina, although it is so very different in its single accessory valve. Sowerby's figure

of the back of the shell, including the dorsal accessory plate, is very good, and it is strange that the subsequent systematists, H. and A. Adams and Chenu, who must have been acquainted with the character of this plate, still leave the species in Dactylina.

Genus Xylophaga Turton.

Xylophaga, Turton, Conch. dith. Brit. p. 253, 1822. Gray, Zool. Proc. p. 188, 1847. Gray, Ann. and Mag. Nat. Hist. 2d ser. p. 380, 1851. H. and A. Adams, Genera, ii. p. 326.

Teredo, Turton, Conch. Dict. 1819.

Pholas, Deshayes, in Lamarck, An. sans Vert. vi. 1835.

Xylotrya, Leach, teste Menke, Syn. ed. 2, p. 121, 1830. Gray, Syn. Brit. Mus. p. 76, 1842.

X. dorsalis, Turton.

Xylophaga dorsalis, Turton, Conch. dith. Brit. p. 253, t. 2, f. 4, 5. H. and A. Adams, Genera, iii. t. 89, f. 4, 4 *a b c*. Alder, Cat. Northumb. Moll. p. 101. Brown, Ill. Brit. Conch. p. 117, t. 50, f. 8—13. Catlow, Conch. Nomenc. p. 3. Chenu, Man. ii. f. 20, 21. Chenu, Encyc. Hist. Nat. Moll. t. 241—244. Fischer, Journ. Conch. 2d ser. iii. p. 49. Fleming, Brit. Anim. p. 455. Forbes and Hanley, Brit. Moll. i. p. 90. t. 2, f. 3, 4. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382. Hanley, Desc. Cat. p. 10. Jay, Cat. 4th ed. p. 9. Reeve, Conch. Syst. t. 22. Sowerby, Genera of Shells. Sowerby, Conch. Manual. Sowerby, Illust. Brit. Shells, t. 1, f. 7. Sowerby, Monog. Xylophaga, Thes. Conch. ii. p. 503, t. 108, f. 103, 104. Thorpe, Brit. Mar. Conch. p. 32.

Teredo dorsalis, Turton, Conch. Dict. p. 185, 1819.

Pholas xylophaga, Deshayes, in Lam. Anim. sans Vert. vi. p. 47, 1835.

Hab.—England.

Coll. Acad. Nat. Sci. Coll. J. C. Jay, M. D. Coll. G. W. Tryon, Jr.

X. globosa, Sowerby.

Xylophaga globosa, Sowerby, Zool. Proc. p. 110, 1835. Sowerby, Monog. Xylophaga, Thes. Conch. ii. p. 503, t. 108, f. 101, 102. H. and A. Adams, Genera, ii. p. 327. Catlow, Conch. Nomenc. p. 3. Chenu, Man. Conch. ii. f. 22, 23. Fischer, Journ. Conch. 2d ser. iii. p. 49. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382. Hanley, Desc. Cat. p. 10. Jay, Cat. 4th ed. p. 9.

Pholas gibbosa, D'Orbigny, Voy. Amer. Merid. Moll. p. 501. Gay, Hist. Nat. Chili, viii. p. 381.

Hab.—Valparaiso; inhabiting wood at sixty fathoms.

Coll. J. C. Jay, M. D.

This shell very closely resembles the English species, but may be distinguished by its more depressed dorsal margin, by its greater posterior length, and by the longitudinal portion of the ventral margin being slightly convex in outline. whilst in X. dorsalis this margin is concave.

Xylophaga cardissa, Gould, Otia Conchologica, p. 241, Feb., 1862.

Hab.—Mergive Archipelago.

Coll. Dr. A. A. Gould.

I owe to Dr. Gould the pleasure of examining specimens of this new form of Xylophaga, which is very distinct from the other species of the genus.

Genus Talona, Gray.

Talona, Gray, Syn. Brit. Mus. 1840. Gray, Proc. Zool. Soc. p. 188, 1847. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 381. H. and A. Adams, Genera, ii. p. 329.

Pholas, (part.) Spengler, Sowerby, Hanley, etc.

T. explanata, Spengler. (Sp.)

Pholas explanata, Spengler, Skrivt. Nat. ii. pt. 1, 1791.

Talona explanata, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii., 1851. H. and A. Adams, Genera, iii. t. 90, f. 2, 2*a*. Fischer, Journ. Conch. 2d ser. iii. p. 51. Mörch, Cat. p. 3.

Pholas clausus, Gray, in Bowdich, Elem. 1822. Catlow, Conch. Nomenc. p. 3. Hanley, Desc. Cat. p. 6, t. 11, f. 8. Jay, Cat. 4th ed. p. 10. Sowerby, Monog. Pholas. Thes. Conch. ii. p. 498, t. 107, f. 74, 75.

Talona clausa Chenu, Man. Conch. ii. f. 34, 35, 1862.

Pholas candidus, Chemn, Conch. Cab. viii. f. 862, 1785.

Hab.—Western Africa.

Coll. Acad. Nat. Sci. Coll. J. C. Jay, M. D. Coll. Isaac Lea, LL. D. Coll. G. W. Tryon, Jr.

Genus Barnea, Leach.

Barnea, Leach, teste Risso, Hist. Nat. iv. p. 376, 1826.
" Risso, H. and A. Adams, Genera, ii. p. 326, 1853.
Barnia, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. 1851. Leach, Moll. Great Britain, p. 254, 1852.

Typical Species.

Margins of the valves regularly rounded, hiatus long and narrow.

B. Australasiæ, Gray.

Barnia Australasiæ, Gray, Brit. Mus. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 381.

Barnea Australasiæ, Fischer, Journ. Conch. 2d ser. iii. p. 49. H. and A. Adams, Genera, ii.

Pholas Australasiæ Sowerby, Mon. Pholas, Thes. Conch. ii. p. 488, t. 106, f. 73.

Hab.—Australia.

This shell closely resembles B. candida of England, but may be at once distinguished by its much larger size and more anterior position of the umbones.

B. Burmanica, Philippi. (Sp.)

Pholas Birmanica, Philippi, Neüer Conchyl. iii. Pholas. t. 1, f. 1.

Barnia Burmanica, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382.

Barnea Burmanica, H. and A. Adams, Genera, ii. p. 326.

Pholas Bakeri? Deshayes, Woodward's Manual, t. 23, f. 19.

Barnea Bakeri? H. and A. Adams, Genera, ii. p. 326.

Hab.—Burmah.

The shape and sculpture of this shell, as figured by Philippi, remind one strongly of our P. costata; it is much broader than either of the other species of this section of Barnea.

B. Bakeri I have not seen, nor could I find the original description; but the figure in Woodward appears to be the same as Burmanica.

B. candida, Linn. (Sp.)

Pholas candida, Linnæus, Syst. Nat. 1111. Linnæus, Mus. Ulric, p. 469. Alder, Cat. Northumb. Moll. p. 100. Bosc, Hist. Nat. des Coq. ii. p. 195. Bouchard-Chantereau, Moll. Boulon, p. 7. Brown, Ill. Conch. Great Britain, p. 115, t. 48, f. 6—10. Bruguierè, Encyc. Meth. t. 168, f. 11. Burrow, Elem. t. 3, f. 4. Catlow, Conch. Nomenc. p. 3. Chemnitz, Conch. Cab. viii. p. 358, t. 101, f. 861. Collard des Cherres, Cat. Moll. Finisterre, p. 9. Crouch, Introd. Lam. t. 2, f. 11. DaCosta, Brit. Conch. p. 246. Deshayes, Moll. Expl. Sci. de l'Algerie, p. 109, t. 9, D. I. f. 4, 5, (Animal.) Deshayes, Traite Elem. i. pt. 2, p. 79, t.

3, f. 13, 14. Deshayes, Encyc. Meth. iii. p. 753. Dillwyn, Desc. Cat. i. p. 36. Donovan, Brit. Shells, iv. t. 132. Fleming, Brit. Anim. p. 457. Forbes and Hanley, Brit. Moll. i. p. 117, t. 4, f. 1, 2. Gerville, Coq. de la Manche, p. 10. Gmelin, Syst. Nat. p. 3215. Gualtieri, Test. t. 105, f. 8. Hanley, Desc. Cat. p. 5, t. 2, f. 3. Jay, Cat. 4th ed. p. 9. Karsten, Mus. Lesk. p. 151. Lamarck, Anim. sans Vert. v. p. 444. Lamarck, (Desh. edit.) vi. p. 44. Lister, Anim. Angl. p. 193, t. 5, f. 39. Macgillivray, Moll. Aberd. p. 306. Mawe, Introd. Conch. t. 3, f. 2. Menke, Syn. p. 73. Middendorff, Mal. Rossica, iii. p. 79. Montagu, Test. Brit. p. 24. Müller, Zool. Dan. prodr. p. 251. Pennant, Brit. Zool. iv. p. 76. Philippi, Enum. Moll. Sicil. i. p. 3 and ii. p. 4. Poli, Test. utr. Sicil. t. 7, f. 12, 13. Potiez et Michaud, Gal. Moll. ii. p. 269. Pultney, Dorset. Cat. p. 26. Schröter, Einleit. Conch. iii. p. 539. Sowerby, Illust. Brit. Conch. t. 1, f. 9. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 488, t. 103, f. 21—23. Thompson, Rep. Fauna Ireland, p. 263. Thorpe, Brit. Mar. Conch. p. 31. Turton, Conch. Dict. p. 144, f. 79. Turton, Conch. dith. Brit. p. 10. Wood, Gen. Conch. p. 79, t. 14, f. 3, 4. Wood, Index Test. Pholas, t. 2, f. 3. Wyatt, Conch. p. 27, t. 3, f. 2.

Barnia candida, Leach, Moll. Great Britain, p. 255. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382. Gray, Figs. Moll. Anim. t. 338, f. 6.

Barnea candida, H. and A. Adams, Genera, ii. p. 326. Chenu, Man. Conch. ii. f. 17, 18. Fischer, Journ. Conch. 2d ser. iii. p. 49.

Pholas dactyloides, Della Chiajè, Mem. iv. t. 65, f. 4.

" *papyracea*, Spengler, Skrivt. Nat. ii. pt. 1, t. 1, f. 4, 1791. (Not of his diagnosis.) Lister, Hist. Conch. t. 435, f. 278.

" *silicula*, Deshayes, in Lam. Anim. sans Vert. vi. p. 45, 1835. Anton, Verzeich. der Conch. p. 1. Catlow, Conch. Nomenc. p. 4. Delessert, Rec. t. 1, f. 19. Hanley, Desc. Cat. p. 6.

Hab.—England. Ireland.

Coll. Acad. Nat. Sci. Coll. J. C. Jay, M. D. Coll. Isaac Lea, LL. D. Coll. G. W. Tryon, Jr.

B. lanceolata, D'Orbigny. (Sp.)

Pholas lanceolata, D'Orb. Moll. Voy. Amer. Merid. p. 497, t. 77, f. 18, 19.

Hab.—Patagonia. South of the Rio Negro.

This shell appears to be distinct from B. candida, although very nearly allied to it. It is not so much inflated across the umbones as that species; it is more narrowly elongate and acuminate at the buccal region, more rounded posteriorly, and the hinge tooth is larger. D'Orbigny's figures also show a vast difference in the great prominence of the concentric raised striæ.

The figures of D'Orbigny represent probably a young shell.

Subgenus Anchomasa, Leach.

Anchomasa, (genus,) Leach, Moll. Great Britain, p. 253.

Ventral anterior margin of the valves emarginate; hiatus short and wide.

B. Manillensis, Philippi. (Sp.)

Pholas Manillensis, Philippi, Zeitschr. für Malak. p. 72, 1847. Philippi, Neüer Conch. iii. Pholas. t. 1, f. 2.

Barnea Manillensis, H. and A. Adams, Genera, ii. p. 326. Fischer, Journ. Conch. 2d ser. iii. p. 49.

Barnia Manillensis, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382, 1851.

Pholas Manillæ, Sowerby, Proc. Zool. Soc. p. 161, 1849. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 487, t. 103, f. 17, 18. Jay, Cat. 4th. edit. p. 10.

Pholas fragilis, Sowerby, Proc. Zool. Soc. p. 161, 1849. Sowerby, Monog. Thes. Conch. ii. p. 488, t. 108, f. 92, 93, 1849.
Barnea fragilis, Fischer, Journ. Conch. 2d ser. iii. p. 49.
Barnia fragilis, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382.
Hab.—Manilla. Philippines.
Coll. Acad. Nat. Sci. Coll. J. C. Jay, M. D. Coll. G. W. Tryon, Jr.

The *Pholas fragilis* of Sowerby is undoubtedly identical with Manillensis. This species differs from B. similis in having a different shaped dorsal plate, which is also much smaller in proportion to the valves, which are narrower, with the umbones placed nearer the anterior end; and by the extension of the ribs over the whole posterior surface, which is quite plain in B. similis. Barnea parva is a wider shell, with the umbones nearer the centre.

B. Parva, Pennant. (Sp.)

Pholas parva, Pennant, Brit. Zool. iv. p. 77, t. 40, f. 13, 1777. Brown, Ill. Brit. Conch. t. 9, f. 11, 12. Catlow, Conch. Nomenc. p. 4. Dillwyn, Desc. Cat. i. p. 38. Fleming, Edin. Encyc. vii. p. 100. Fleming, Brit. Anim. p. 457. Forbes and Hanley, Brit. Moll. i. p. 111, t. 2, f. 2; t. 4, f. 1, 2 (Animal t. F. f. 3, 3*a*.) Hanley, Desc. Cat. p. 5, t. 2, f. 6. Jay, Cat. 4th edit. p. 10. Montagu, Test. Brit. p. 22, t. 1, f. 7, 8. Philippi. Neüer Conch. iii. Pholas, t. 2, f. 2. Sowerby, Illust. Brit. Conch. t. 1, f. 10. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 487, f. 31, 32. Thorpe, Brit. Mar. Conch. p. 32, f. 71. Turton, Conch. Dict. p. 143. Turton, Conch. dith. Brit. p. 9. Wood, Gen. Conch. p. 82. Wood, Index Test. t. 2, f. 6.

Barnia parva, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382. Gray, Figs. Moll. Anim. t. 338, f. 10.

Barnea parva, H. and A. Adams, Genera, iii. t. 89, f. 3, 3*a*, *b*. Chenu, Man. ii. f. 19. Fischer, Journ. Conch. 2 ser. iii. p. 49.
Anchomasa Pennantiana, Leach, Moll. Gt. Britain, p. 253.
Pholas crenulatus, Solander. Spengler, Skrivt. Nat. ii. pt. 1, p. 92.
" *dactylus*, var. Deshayes. In Lamarck Anim. sans Vert. vi. p. 45, *note*.
" *dactyloides*, Lamarck, Anim. sans Vert. v. p. 445. Menke, Syn. p. 73.
" *ligamentina*, Deshayes, Traite Elem. p. 80, t. f. 11, 12? Catlow, Conch. Nomenc. p. 4.
" *tuberculatus*, Turton, Conch. dith. Brit. p. 5, t. 1, f. 7, 8. Brown, Illust. Brit. Conch. p. 115, t. 49, f. 12, 13. Chenu, Ill. Conchyl. t. 3, f. 3. Fleming, Brit. Anim. p. 547. Hanley, Desc. Cat. p. 9. Thorpe, Brit. Mar. Conch. p. 30. Wood, Index Test. Supp. t. 1, f. 3.
Hab.—England.
Coll. Acad. Nat. Sciences. Coll. J. C. Jay, M. D. Coll. Isaac Lea, LL. D. Coll. G. W. Tryon, Jr.

Forbes and Hanley (Brit. Moll.), after an examination of the original specimen of Dr. Turton's *Pholas tuberculatus*, pronounced it to be a monstrosity of B. parva, and not a synonym of D. dactylus, as Gray and others supposed.

B. subtruncata, Sowerby. (Sp.)

Pholas subtruncata, Sowerby, Zool. Proc. p. 69, 1834. Catlow, Conch. Nomenc. p. 4. D'Orbigny, Moll. Voy. Amer. Merid. p. 499. Hanley, Desc. Cat. p. 6. Jay, Cat. 4th edit. p. 10. Müller, Syn. Test. p. 236.
Pholas lamellosa, D'Orb. Voy. Am. Merid. p. 498, t. 77, f. 20, 21.
Hab.—Payta, Peru, Isle Plata (subtruncata); Patagonia, south of Rio Negro (*lamellosa.*)

Judging from the descriptions, D'Orbigny's species is founded on a variety of subtruncata in which the anterior ribs are much more prominent. The obtusely rounded form of the posterior end and the nearly parallel dorsal and ventral margins distinguish this from B. parva, to which, however, it is very

closely allied. It may eventually prove to be a mere variety of that shell. The absence of a posterior accessory plate prevents this species from being placed in the genus Pholas, where it is nearly allied to P. truncata.

B. Erythræa, Gray.

Barnia Erythræa, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382, 1851.

Barnea Erythræa, H. and A. Adams, Genera, ii. p. 326.

Hab.—Red Sea.

This shell, which has not yet been figured, seems to be allied to B. similis, but is probably distinct.

B. similis, Gray. (Sp.)

Pholas similis, Gray, in Yates' New Zealand. Catlow, Conch. Nomenc. p. 4. Jay, Cat. 4th edit. p. 10. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 487, t. 103, f. 12—14.

Barnia similis, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382.

Barnea similis, H. and A. Adams, Genera, ii. p. 326. Fischer, Journ. Conch. 2d ser. iii. p. 49.

Pholas antipodum, Philippi, Zeitschr. für Malak. p. 71, 1847.

" *antipodarum*, Philippi. Gray, Ann. and Mag. N. Hist. 2d ser. viii. p. 382. 1851.

Hab.—New Zealand.

Coll. Acad. Nat. Sciences. Coll. J. C. Jay, M. D. Coll. G. W. Tryon, Jr.

Genus Navea, Gray.

Navea, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385.

N. nucifera, Fabricius (sp.)

Pholas nucifera, Fabricius. Spengler, Skrivt. Nat. iv. p. 40, t. 10, f. 4, 9. Fischer, Journ. Conch. 2d ser. iii. p. 50.

Navea nucifera, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385. H. and A. Adams, Genera, ii. p. 328. Mörch, Cat. p. 2.

According to Dr. Gray, resembling tenuis, but appears to be shorter in front and longer and more rounded behind.

N. subglobosa, Gray.

Navea subglobosa, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385, 1851. Chenu, Man. Conchyl. ii. f. 28, 29. H. and A. Adams, Genera, iii. t. 89, f. 6, 6, *a*, 6, *b*. Fischer, Journ. Conchyl. 2d ser. iii. p. 50.

Hab.—California.

N. tenuis, Gray.

Navea tenuis, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385, 1851. H. and A. Adams, Genera, ii. p. 328. Fischer, Journ. Conchyl. 2d ser. iii. p. 50.

Hab.— ?

Genus Zirphæa, Leach.

Zirphæa, Leach. H. and A. Adams, Genera, ii.

Zirfæa, Leach. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385, 1851.

Z. constricta, Sowerby (sp.)

Pholas contricta, Sowerby, Proc. Zool. Soc. p. 161, 1849. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 489, t. 104, f. 27, 28.

Zirphæa constricta, H. and A. Adams, Genera, ii. p. 327. Fischer, Journ. Conch. 2d ser. iii. p. 50.

Zirphæa constricta, Gray, Ann. and Mag. N. H. 2d ser. viii. p. 385, 1851.

Hab.—Straits of Sunda.

Fischer (Journ. Conch.) believes this to be an immature shell; however this may be, there can be no doubt that it is a good species.

Z. crispata, Linnæus. (Sp.)

Pholas crispata, Linn. Syst. Nat. 1111. Linn. Mus. Ulric, ii. p. 469. Alder, Cat. Northumb. Moll. p. 100. Anton, Verzeich. der Conchyl. p. 1. Bosc. Hist. Nat. des Coq. ii. p. 195. Bouchard-Chantreaux, Moll. Boulon. p. 7. Brown, Ill. Conch. Gt. Brit. p. 114, t. 48, f. 1—5. Bruguierè, Encyc. Meth. t. 169, f. 5—7. Catlow, Conch. Nomenc. p. 3. Chemnitz, Conch. Cab. viii. t. 102, f. 872—874. Collard des Cherres, Cat. Moll. Finisterre, p. 9. Dekay, Moll. N. York, p. 247, t. 32, f. 306, *a*, *b*. Deshayes, Traité Elem. i. pt. 2, p. 77. Dillwyn, Desc. Cat. i. p. 40. Donovan, Brit. Shells, ii. p. 3, t. 62. Fleming, Edinb. Encyc. vii. p. 100. Fleming, Brit. Anim. p. 456. Forbes and Hanley, Brit. Moll. i. t. 4, f. 3, 4, 5. Gerville, Cat. Coq. Manche, p. 10. Gmelin, Syst. Nat. p. 3216. Gould, Invert. Mass. p. 27. Hanley, Desc. Cat. p. 7. Jay, Cat. 4th edit. p. 10. Lamarck, Anim. sans Vert. v. p. 445. Lamarck, (edit. Brux.) ii. p. 518. Lamarck, (edit. Desh.) vi. p. 46. Lister, Anim. Angl. p. 192, t. 5, f. 38. Macgillivray, Moll. Aberd. p. 306. Montagu, Test. Brit. p. 23. Olafsen, Isl. f. 4, 6. Pennant, Brit. Zooi. iv. p. 77, t. 40, f. 12. Petiver, Gazoph. t. 79, f. 13. Potiez et Mich. Gal. ii. p. 268. Pultney, Dorset Cat. p. 27. Russell, Essex (Mass.) Journ. Nat. Hist. i. p. 50. Schröeter, Einleit. iii. p. 541. Schumacher, Essai d'un Nov. Syst. p. 96. Sowerby, Illust. Brit. Shells, t. 1, f. 11. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 489, t. 104, f. 37. Spengler, Skrivt. Nat. ii. pt. 1, p. 96. Stimpson, Shells N. England, p. 25. Stimpson, Check-List, E. Coast Shells. Thorpe, Brit. Mar. Conch. p. 29. Turton, Conch. Dict. p. 146. Turton, Conch. dith. Brit. p. 6. Wheatley, Cat. Shells U. S. p. 2. Wood, Gen. Conch. t. 15, f. 4, 5. Wood, Index Test. t. 2, f. 5. Wyatt, Conch. p. 28.

Zirphæa crispata, H. and A. Adams, Genera, iii. t. 89, f. 5—5*a*. Mörch. Cat. p. 3. Fischer, Journ. Conch. 2d ser. iii. p. 50. Chenu, Man. ii. f. 26, 27.

Zirfæa crispata, Gray, Figs. Moll. Anim. t. 338, f. 5 and t. 339, f. 5. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385.

Thurlosia crispata, Leach, Moll. Gt. Britain, p. 252.

Mya crispata, Linn. Faun. Suec. 2125.
Pholas bifrons, Da Costa, Brit. Conch. p. 242, t. 16, f. 4.
Solen crispus, Gmelin, Syst. Nat. p. 3228.
Pholas crispa, Blainville, Malacol. t. 79, f. 7.
" *parva*, Da Costa, Conch. p. 247. Donovan, Brit. Shells, ii. t. 69. Bruguierè, Encyc. Meth. t. 169, f. 5. Lister, Hist. Conch. t. 436, f. 279.
Hab.—England, France, Sweden, Denmark, Northern Coast United States, West Coast America? (Carpenter.)
Coll. Acad. Nat. Sciences. Coll. Isaac Lea, LL. D. Coll. J. C. Jay, M. D. Coll. G. W. Tryon, Jr.

Z.? Julan, Adanson. (Sp.)

Pholas Julan, Adans. Senegal, p. 260, t. 19, f. 1.

Zirphæa? Julan, H. and A. Adams, Genera, ii. p. 327. Fischer, Journ. Conch. 2d ser. iii. p. 50.

Zirfæa? Julan, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385.
" *Mulan*, Gray, Figs. Moll. Anim. t. 338, f. 2.
Hab.—Senegal.

Subfamily JOUANNETINÆ, Tryon.

Genus PHOLADIDEA, Turton.

PHOLADIDEA, Turton, Conch. Dict. p. 147, 1819. Gray, Zool. Proc. p. 188, 1847. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. 1851. Chenu, Man. Conchyl. ii. Fischer, Journ. Conchyl. 2d ser. iii. H. and A. Adams, Genera, ii.

Pholadidoidea, Goodall, teste Blainville, Dict. Sci. Nat. xxxix. p. 535, 1826.

Pholadididea, Agassiz, Nomenc. Zool. 1846.

Cadmusia, Leach, Moll. Gt. Brit. p. 254, 1852.

Pholidæa, Leach, teste Swainson, Malacol. 1840.

**Siphonal valves without any tubular elongation and not folded.*

P. papyracea, Solander. (Sp.)

Pholas papyracea, Solander, MSS. Turton, Conch. dith. Brit. p. 2, t. 1, f. 1—4. Brown, Ill. Brit. Conch. p. 114, t. 49, f. 4, 6, 7, 8, 9. Catlow, Conch. Nomenc. p. 4. Chenu, Ill. Conch. Pholas, t. 3, f. 1. Fleming, Brit. Anim. p. 456. Hanley, Desc. Cat. p. 9. Jay, Cat. 4th edit. p. 10. Mawe, Conch. t. 3, f. 5. Philippi, Conchyl. iii. Pholas, t. 2, f. 3. Reeve, Conch. Syst. t. 2, f. 3. Sowerby, Genera, Pholas, f. 3. Sowerby, Conch. Man. f. 56. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 497, t. 106, f. 66. Thorpe, Brit. Mar. Conch. p. 29. Wood, Index Test. Supp. t. 1, f. 3.

Pholadidea papyracea, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 384. Gray, Figs. Moll. Anim. t. 338, f. 8. H. and A. Adams, Genera, iii. t. 90, f. 1, 1*a*, 1*b*. Chenu, Man. Conch. ii. f. 30, 31. Fischer, Journ. Conch. 2d ser. iii. p. 51. Forbes and Hanley, Brit. Moll. i. p. 123, t. 5, f. 3—6; Animal t. F, f. 4. Sowerby, Ill. Brit. Shells, t. 1, f. 12. Woodward, Man. t. 23, f. 20.

Pholas lamellata (young shell), Turton, Conch. Dith. Brit. p. 4, t. 1, f. 5, 6. Brown, Ill. Brit. Conch. p. 114, t. 49, f. 10, 11. Chenu, Ill. Conch. Pholas, t. 3, f. 2. Fleming, Brit. Anim. p. 456. Wood, Index Test. Supp. t. 1, f. 3.

Pholas striata, Blainville, Man. Malacol. t. 8 *bis*, f. 7. Cuvier, Reg. Anim. (edit. Griffith), t. 8, f. 1. Cuvier (Henderson, edit.), t. 41, f. 1. Wyatt, Conch. t. 3, f. 5.

Pholadidea loscombia, Turton, Conch. Dict. p. 147.

Pholadidea Goodallii, Blainville, Dict. Sc. xxxvii. p. 532.

Cadmusia Solanderiana Leach, Moll. Gt. Brit. p. 254, t. 12, f. 1, 2.

Pholas Vibonensis, (fossil,) Philippi, Enum. Moll. Sicil. ii. p. 4, t. 13, f. 5.

Zirfæa? Vibonensis, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385.

Hab.—Europe.

Coll. Acad. Nat. Sci. Coll. Isaac Lea, LL. D. Coll. J. C. Jay, M. D. Coll. Geo. W. Tryon, Jr.

Pholas lamellata of Turton is the young of this species, although for a long time it was considered distinct. The differences between the young and mature shells in this family are so great, that in several cases the former have been described as different. Even the mature shell varies much, and the result has been the creation of a number of species which more recent authors have been obliged to suppress.

P. spathulata, Sowerby. (Sp.)

Pholas spathulata, Sowerby, Zool. Proc. p. 162, 1849. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 497, t. 106, f. 69, 70.

Pholadidea spathulata, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 384. H. and A. Adams, Genera, ii. p. 329. Fischer, Journ. Conch. 2d ser. iii. p. 51.

Hab.—New Zealand.

This shell somewhat resembles P. papyracea in its external markings, but it is narrower, longer, more acuminate posteriorly and the impressed rib more oblique. The form of the cup-shaped appendage is also different.

P. sulcata, Brown. (Sp.)

Pholas sulcata, Brown, Ill. Conch. Gt. Brit. p. 115, t. 48, f. 17, 18.

Pholadidea sulcata, H. and A. Adams, Genera, ii. p. 329. Fischer, Journ. de Conchyl. 2d ser. iii. p. 51. Forbes and Hanley, Brit. Moll. i. p. 128.

Hab.—England.

Only a single valve of this shell has been found; it agrees very nearly with the young of P. papyracea, but Capt. Brown is confident of its specific value.

P. ovoidea, Gould. (Sp.)

Pholas ovoidea, Gould, Jour. Bost. Soc. N. Hist. vi. p. 388, t. 15, f. 1.

Parapholas ovoidea, H. and A. Adams, Genera, ii. p. 330. Fischer, Journ. Conch. 2d ser. iii. p. 52.

Pholadidea ovoidea, Carpenter, Rep. on W. Coast Shells. Carpenter, Zool. Proc. 1856, p. 198.

Hab.—Lower California.

Coll. A. A. Gould, M. D.

This species probably belongs in the genus Pholadidea, although its position cannot be accurately determined on account of the loss of its dorsal valves. Its form and sculpture will readily distinguish it from the other species.

Subgenus Talonella, Gray.

Talonella, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385, 1851.

Siphonal valves without any tubular prolongation, and with a longitudinal and transverse fold.

P. tridens, Gray.

Pholas (Talonella) tridens, Gray, Brit. Mus. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 498, t. 106, f. 60, 61.

Pholadidea tridens, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385. H. and A. Adams, Genera, ii. p. 329. Fischer, Journ. Conchyl. 2d ser. iii. p. 51.

Hab.—Monte Christo.

The form of the cup distinguishes this curious little species from all others. Although so small, the shell is adult, as is evidenced by the presence of the anterior ventral callous plate.

Subgenus Hatasia, Gray.

Hatasia, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385, 1851.

Siphonal valves with a tubular shelly prolongation.

1. P. melanura, Sowerby. (Sp.)

Pholas melanura, Sowerby, Proc. Zool. Soc. p. 70, 1834. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 499, t. 107, f. 78, 79. Catlow, Conch. Nomenc. p. 4. Conrad, Journ. Acad. Nat. Sc. 2d ser. ii. p. 335, 1854. D'Orbigny, Moll. Voy. Amer. Merid. p. 499. Müller, Syn. Test. Viv. p. 238.

Pholadidea melanura, Gray, Ann. and Mag. 2d ser. viii. p. 385. H. and A. Adams, Genera, ii. p. 329. Carpenter, Rep. on West Coast Mollusca. Carpenter, Cat. Mazatlan Shells, p. 8. Chenu, Man. Conch. ii. f. 32, 33, Fischer, Journ. Conch. 2d ser. iii. p. 51.

Penitella Wilsonii, Conrad, Proc. Acad. Nat. Sc. p. 156, Feb. 1849. Conrad, Journ. Acad. Nat. Sc. 2d ser. i. p. 279, t. 39, f. 4.

Hab.—Lower California.

Coll. Acad. Nat. Sci. Coll. J. C. Jay. M. D. Coll. G. W. Tryon, Jr.

This splendid shell may be readily distinguished from the other two species of the subgenus Hatasia by its much larger size. In the form of its cup-shaped appendage it is allied to the following species:

By a typographical error in Conrad's description of *P. Wilsonii* in the Journal of the Academy, reference is made to fig. 5 instead of fig. 4; this has led Dr. Gray to consider the figure a bad representation of the species, and to mistake the scope intended to be given by Mr. Conrad to the genus Penitella.

P. quadra, Sowerby. (Sp.)

Pholas quadra, Sowerby, Zool. Proc. p. 71, 1834. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 499, t. 106, f. 62, 63. Catlow, Conch. Nomenc. p. 4. D'Orbigny, Moll. Voy. Amer. Merid. p. 500. Hanley, Desc. Cat. 4th edit. p. 10. Müller, Syn. Test. Viv. p. 238.

Pholadidea quadra, Gray, Ann. and Mag. 2d ser. viii. p. 385. H. and A. Adams, Genera, ii. p. 329. Fischer, Journ. Conch. 2d ser. iii. p. 51.

Hab.—Monte Christo.

Coll. J. C. Jay, M. D.

Resembles tubifera very closely, but the posterior appendage is four-lobed, whilst in tubifera it consists of two reflected lobes; from P. tridens it may be distinguished, besides the subgeneric differences, by its anterior dorsal plates being more spread out over the dorsal surface of the shell.

P. tubifera, Sowerby. (Sp.)

Pholas tubifera, Sowerby, Proc. Zool. Soc. p. 71, 1834. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 499, t. 106, f. 64, 65. Adams, Panama Shells, p. 302. Catlow, Conch. Nomenc. p. 4. D'Orbigny, Moll. Voy. Amer. Merid. p. 499. Hanley, Desc. Cat. p. 8. Jay, Cat. 4th edit. p. 10. Müller, Syn. Test. Viv. p. 238.

Pholadidea tubifera, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385. H. and A. Adams, Genera, ii. p. 329. Fischer, Journ. Conchyl. 2d ser. iii. p. 51.

Hab.—Panama; West Colombia.

Coll. J. C. Jay, M. D.

Genus Parapholas, Conrad.

Parapholas, Conrad, Proc. Acad. Nat. Sc. p. 121, Dec. 1848. Journ. Acad. Nat. Sc. 2d ser. i. pt. 3, p. 214, and ii. pt. 4, p. 335. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 380. H. and A. Adams, Genera, ii.

The genus Penitella has been referred by many authors to the synonymy of this genus. Mr. Conrad is almost universally credited with Penitella; which, however he merely adopted from Valenciennes, without giving any description of its characters.

Dr. Gray includes the P. penita of Conrad under a section of Parapholas, described as having a single impressed rib and single posterior umbonal valve; while the other species have two impressed ribs and the posterior dorsal cavity divided.

I have thought it best to restore for this shell the original generic name of Penitella.

P. Californica, Conrad.

Pholas Californica, Conrad, Journ. Acad. Nat. Sc. vii. p. 236, t. 18, f. 5. Catlow, Conch. Nomenc. p. 3. Hanley, Desc. Cat. p. 8, t. 9, f. 43.

Jay, Cat. 4th edit. p. 9. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 491, t. 102, f. 5, 6, 7.

Parapholas C a l i f o r n i c a, Conrad, Proc. Acad. Nat. Sc. p. 121, 1848. Conrad, Journ. Acad. Nat. Sc. 2d ser. i. p. p. 214, and ii. p. 335. Carpenter, Zool. Proc. p. 209, 1856. Carpenter, Rep. on W. Coast Mollusca. Carpenter, Check-List W. Coast Shells.

Pholas Janelli, Deshayes, Proc. Zool. p. 357, 1839. Deshayes, Guerin's Mag. Zool. t. 14, 15, 16, 1840. Catlow, Conch. Nomenc. p. 3. Chenu, Ill. Conch. Pholas, t. 3, f. 5.

Parapholas Janelli, H. and A. Adams, Genera, ii. p. 330. Chenu, Man. Conch. ii. f. 41, 42. Fischer, Journ. Conch. 2d ser. iii. p. 52.

Martesia C a l i f o r n i c a, Chenu, Mon. Conch. ii. f. 53.

Hab.—California.

Coll. Acad. Nat. Sciences. Coll. J. C. Jay, M. D. Coll. G. W. Tryon, Jr.

P. q u a d r i z o n a l i s, Spengler. (Sp.)

Pholas q u a d r i z o n a l i s (young shell), Spengler. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 492, t. 108, f. 88, 89.

Parapholas q u a d r i z o n a l i s, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. H. and A. Adams, Genera, iii. t. 90, f. 4, 4*a*. Fischer, Journ. Conch. 2d ser. iii. p. 52.

Pholas Incii (adult), Sowerby, Zool. Proc. 1849. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 491, t. 105, f. 45, 46.

Hab.—Torres' Straits.

Genus Penitella, Valenciennes.

Penitella, Valenciennes, Voy. Venus, atlas, t. 24, (no description), (part.) Journ. Conrad, Acad. Nat. Sc. 2d ser. ii. p. 335.

Parapholas (part.), Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. Carpenter, Zool. Proc. 1856.

Pholadidea (part.), Carpenter, Rep. on W. Coast Mollusca and Check-List.

I cannot find that the text of the Mollusca of Voy. Venus was published, but the figure and the name printed on the plate sufficiently indicate the genus. The three other species of Valenciennes I am unable to make out. No. 2 resembles Martesia striata. No. 4 is a very young shell.

P. p e n i t a, Conrad. (Sp.)

Pholas p e n i t a, Conrad, Journ. Acad. Nat. Sc. vii. p. 237, t. 18, f. 7. Jay, Cat. 4th edit. p. 10.

Parapholas p e n i t a, Carpenter, Zool. Proc. p. 210, 1856. Carpenter, Rep. on West Coast Mollusca.

Pholadidea p e n i t a, Carpenter, Check-List W. Coast Shells. Carpenter, Rep. on W. Coast Mollusca.

Pholas concamerata, Deshayes, Rev. Zool. p. 357, 1839. Deshayes, Guerin's Mag. Zool. t. 17, 1840. Chenu, Ill. Conchyl. Pholas, t. 3, f. 4. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 497, t. 106, f. 67, 68.

Parapholas concamerata, Chenu, Man. ii. f. 43, 44. Fischer, Journ. Conch. 2d ser. iii. p. 52. H. and A. Adams, Genera, ii. p. 330. Gray, Ann. and Mag. N. H. 2d ser. viii. p. 383.

Pholas cucullata, Gray, Syn. Br. Mus. 1840.

Penitella Conradi, Valenciennes, Voy. Venus, atlas, t. 24, f. 1. Conrad, Journ. Acad. Nat. Sc. 2d ser. ii. p. 335.

Pholas Darwinii, Sowerby, Monog. Pholas, Thes. Conch. ii. p. 490, t. 107, f. 76, 77.

Zirfæa? Darwinii, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 385.

Jouannetia Darwinii, H. and A. Adams, ii. p. 330. Fischer, Journ. Conch. 2d ser. iii. p. 51. Chenu, Manuel, ii. f. 39, 40.

Pholas cornea? Sowerby, Zool. Proc. 1834, p. 72. Catlow, Conch. Nomenc. p. 3. Hanley, Desc. Cat. p. 9.

Hab.—California, (penita.) W. Columbia, (*cornea.*) Chiloe (*Darwinii.*) Coll. Acad. Nat. Sciences.

P. Darwinii, Sowb. is the young of this species; I have also included Sowerby's *P. cornea*, as his description seems in the main to correspond, I cannot understand why several of Sowerby's and D'Orbigny's species were omitted from Sowerby's Monograph and are not contained in Gray. Nor is any reference made to them.

Genus Jouannetia, Desmoulins.

Jouannetia, Chas. Desmoulins, Bull. Linn. Soc. Bordeaux, ii. p. 244. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382. H. and A. Adams, Genera, ii. p. 330. Chenu, Man. ii. f. 36. Fischer, Journ. Conch. 2d ser. iii. p. 51.

Triomphalia, Sowerby, Monog. Thes. Conch. ii. p. 500, 1849. Sowerby, Zool. Proc. 1849.

Pholas, (part.) Deshayes, in Lam. An. sans Vert. vi. p. 46.

**Valves with two impressed radiating grooves.*

J. Cumingii, Sowerby. (Sp.)

Triomphalia Cumingii, Sowerby, Zool. Proc. p. 161, 1849. Sowerby, Monog. Triomphalia, Thes. Conch. ii. p. 502, t. 106, f. 56, 57.

Jouannetia Cumingii, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382. H. and A. Adams, Genera, ii. p. 330. Chenu, Man. Conch. ii. f. 38. Fischer, Journ. Conch. 2d ser. iii. p. 51.

Hab.—Philippines.

This beautiful little species merits the name of the following instead of that which it bears, being almost entirely spherical.

J. globosa, Quoy. (Sp.)

Pholas globulosa, Quoy, Voy. Astrolabe, Mollusques, p. 549, t. 85, f. 16—18.

Triomphalia globosa, Sowerby, Proc. Zool. Soc. p. 160, 1849. Sowerby, Monog. Triomph. Thes. Conch. ii. p. 501, t. 106, f. 54, 55.

Jouannetia globosa, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 382. H. and A. Adams, Genera, iii. t. 90, f. 3, 3*a b*. Chenu, Man. ii. f. 36. Fischer, Journ. Conch. 2d ser. iiii. p. 51.

Jouannetia globulosa, Gray, Figs. Moll. Anim. t. 338, f. 3.

Hab.—Philippines.

Coll. Acad. Nat. Sci. Coll. G. W. Tryon, Jr.

This shell is not so round as J. Cumingii, being somewhat ovate in form. It is also a smaller species, and differs in the posterior margin of the right valve being toothed. In the latter respect it resembles J. pectinata, but the teeth are larger and not so numerous, and the surface of the valves is bisulcate.

***Valves with a subcentral impressed radiating groove.*

Subgenus Pholadopsis, Conrad.

Genus Pholadopsis, Conrad, Proc. Acad. Nat. Sci. p. 156, 1849.

As Conrad's type species differs from the others in having but one radiating groove, Dr. Gray has very properly separated it as a subgenus.

J. pectinata, Conrad. (Sp.)

Pholadopsis pectinata, Conrad, Journ. Acad. Nat. Sci. 2d ser. i. p. 279, t. 39, f. 3.

Jouannetia pectinata, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 383. H. and A. Adams, Genera, ii. p. 330. Fischer, Journ. Conch. 2d ser. iii. p. 51.

Triomphalia pulcherrima, Sowerby, Zool. Proc. p. 161, 1849. Sowerby, Monog. Triomph. Thes. Conch. ii. p. 501, t. 106, f. 58, 59.

Jouannetia pulcherrima, Chenu, Man. ii. f. 37.

Hab.—California. W. Colombia.

Genus MARTESIA, Leach.

MARTESIA, Leach, MSS. Blainville, Dict. Sci. Nat. 1824. Blainville, Malacol. p. 632, 1825. Gray, Zool. Proc. p. 188, 1847. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 380.

Mactresia, Gray, Syn. Brit. Mus. p. 91, 1842. (Typographical error.)

**Valves with two impressed ribs, the hinder one oblique; the anterior dorsal marginal reflection depressed.*—Gray, Ann. and Mag. Nat. Hist. p. 383, 1851.

M. branchiata, Gould. (Sp.)

Pholas branchiata, Gould, Bost. Proc. p. 290, 1845. Jay, Cat. p. 9. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 493, t. 108, f. 82, 83.

Martesia branchiata, Gray, Ann. and Mag. 2d ser. viii. p. 383. H. and A. Adams, Genera, ii. p. 331. Fischer, Journ. Conch. 2d ser. iii. p. 52.

Hab.—Africa.

Coll. J. C. Jay, M. D.

This shell differs from the following in the dorsal plate being bilobed posteriorly, around a portion of the dorsal posterior integument, and in the absence of radiating crenulations on the anterior third of the surface of the valve.

M. calva, Sowerby. (Sp.)

Pholas calva, Sowerby, Proc. Zool. Soc. p. 69, 1834, and p. 162, 1835. Sowerby, Monog. Pholas, Thes. Conch. p. 493, t. 105, f. 51—53. Catlow, Conch. Nomenc. p. 3. Müller, Syn. Test. Viv. p. 237. Hanley, Desc. Cat. p. 7.

Parapholas calva, Carpenter, Mazatlan Shells, p. 9.

Martesia calva, Gray, Ann. and Mag. viii. p. 383. H. and A. Adams, Genera, ii. p. 331. Carpenter, Rep. on W. Coast Mollusca. Chenu, Man. ii. f. 45—47. Fischer, Journ. Conch. 2d ser. iii. p. 52.

Pholas acuminata, Sowerby, Zool. Proc. p. 70, 1834. Sowerby, Monog. Pholas. Thes. Conch. ii. p. 492, t. 105, f. 48—50. Catlow, Conch. Nomenc. p. 3. Hanley, Desc. Cat. p. 8, t. 9, f. 30. Jay, Cat. 4th ed. p. 10. Müller, Syn. Test. Viv. p. 237.

Parapholas acuminata, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. H. and A. Adams, Genera, ii. Carpenter, W. Coast Report, Check List, and Mazatlan Shells, p. 12.

Martesia acuminata, Chenu, Man. ii. f. 56.

Parapholas bisulcata, Conrad. Journ. Acad. Nat. Sci. 2d ser. i. p. 279, t. 39, f. 5.

Hab.—California. Mazatlan. Panama.

Cab. Acad. Nat. Sci. Cab. J. C. Jay, M. D. Cab. G. W. Tryon, Jr.

The very variable nature of the dorsal plate has caused the erection of three species for this shell. Mr. P. P. Carpenter, in his Catalogue of Mazatlan Shells, says of *P. acuminata*, "The author of this species distinguishes it from calva by the shape of the laminæ and posterior portion, which are variable in both forms, and by the character of the umbonal shield. This last is the only constant character of difference. It is not only smaller, not projecting beyond the dorsal plate, (which is not the result of age, being found in

all the specimens,) but, in all the specimens allowing of observation, it is turned in all around, instead of at the anterior portion only, as in calva. The external surface also is generally rougher, and the posterior gap smaller, not displaying the bipartite lamina so clearly. Still, as the shells exactly agree in all other respects, it is probable that these differences only result from changes in situation. All the calvæ were taken out of Spondylus; all the acuminatæ were sent loose; and, from their extremely perfect condition, were probably extracted from clay or wood. If the latter, the irregularities of the decaying timber might cause the roughening of the plate-surface. The original specimens of acuminata, however, were taken out of argillaceous limestone."

Specimens in Coll. Acad. Nat. Sci. exhibit intermediate characters.

** *Valves with a single subcentral impressed rib; the anterior dorsal reflection close-pressed, and furnished with an elevated internal rib.*—Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 383.

M. curta, Sowerby. (Sp.)

Pholas curta, Sowerby, Zool. Proc. p. 71, 1834. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 944, t. 104, f. 33, 34. Hanley, Desc. Cat. p. 9. Jay, Cat. 4th ed. p. 10. Müller, Syn. Test. p. 239, t. 108, f. 105.

Pholadidea curta, Carpenter, Rep. on W. Coast Mollusca.

Martesia curta, Gray, Ann. and Mag. viii. p. 384. H. and A. Adams, Genera, ii. p. 331. Chenu, Man. ii. f. 51. Fischer, Journ. Conch. 2d ser. iii.

Hab.—Panama.

Coll. Acad. Nat. Sci. Coll. J. C. Jay, M. D.

M. intercalata, Carpenter.

Martesia intercalata, Carpenter, Cat. Mazatlan Shells, p. 13.

Hab.—Mazatlan.

M. multistriata, Sowerby. (Sp.)

Pholas multistriata, Sowerby, Zool. Proc. 1849. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 494, t. 104, f. 35, 36.

Martesia multistriata, H. and A. Adams, Genera, ii. p. 331. Fischer, Journ. Conch. 2d ser. iii. p. 52. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 383.

Hab.—Australia.

"Resembling Ph. curta, but the striæ on the umbonal part of the anterior are very much finer, and the posterior termination is elongated. The dorsal shield is more oval, rounded anteriorly, and acuminated posteriorly."—*Sowerby.*

M. obtecta, Sowerby. (Sp.)

Pholas obtecta, Sowerby, Zool. Proc. 1849. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 496, t. 108, f. 80, 81.

Martesia obtecta, Gray, Ann. and Mag. 2d ser. viii. p. 384. H. and A. Adams, Genera, ii. p. 331. Fischer, Journ. Conchyl. 2d ser. iii. p. 52.

Hab.—Philippines.

Coll. Acad. Nat. Sci. Coll. G. W. Tryon, Jr.

The two-lobed dorsal plate, (which from numerous specimens appears to be a permanent character,) together with the greater size of the shell and some difference in the sculpture, are the characters which distinguish this shell from M. multistriata; it would not be surprising, however, if specimens from other localities would prove that this shell is only a well-grown form of multistriata.

M. ovum, Gray.

Pholas ovum, Gray, in Wood, Index Test. Supp. f. 4. Catlow, Conch. Nomenc. p. 4. Hanley, Desc. Cat. p. 7.
" ovata, (Gray,) Sowerby, Monog. Pholas, Thes. Conch. ii. p. 493, t. 107, f. 71, 72. Jay, Cat. 4th ed. p. 10.

Martesia ovum, Gray, Ann. and Mag. viii. p. 383. H. and A. Adams, Genera, ii. p. 331. Fischer, Journ. Conch. 2d ser. iii. p. 52.
Hab.—West Indies. *Hanley.*
Much larger than either of the other species of this section of the genus.

****Valves with a single subcentral impressed rib; the anterior dorsal reflection erect, separated from the outer surface of the valve.*—Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 384.

M. aperta, Sowerby. (Sp.)

Pholas aperta, Sowerby, Zool. Proc. 1849. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 491, t. 108, f. 99, 100.

Martesia aperta, Gray, Ann. and Mag. 2d ser. viii. p. 384. H. and A. Adams, Genera, ii. p. 331. Fischer, Journ. Conch. 2d ser. iii. p. 52.
Hab.—Straits of Sunda.
The character of the striæ is different in this species from M. cuneiformis, the undulations being finer and more angular. The shell is a young one, the ventral plate being absent.

M. Australis, Gray.

Martesia Australis, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 384. H. and A. Adams, Genera, ii. p. 331. Fischer, Journ. Conch. 2d ser. iii. p. 52.
Hab.—N. W. Australia.
This species has not yet been figured, but Dr. Gray states that the anterior waved concentric edges are rather distant,—fewer than in M. striata.

M. cuneiformis, Say. (Sp.)

Pholas cuneiformis, Say, Journ. Acad. Nat. Sci. ii. p. 322. DeKay, Moll. New York, p. 248. Kurtz, Cat. p. 3. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 495, t. 104, f. 38, 39, t. 108, f. 86, 87. Wheatley, Cat.

Pholadidea cuneiformis, Stimpson's Check List.

Martesia cuneiformis, Fischer, Journ. Conch. 2d ser. iii. p. 52. H. and A. Adams, Genera, ii. p. 331. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 384.
Pholas Edwardsii, Gray, Syn. Brit. Mus. 1820.
" *rudis*, " " " " "
Hab.—Southern United States. West Indies.
Coll. Acad. Nat. Sci. Coll. Isaac Lea, LL. D. Coll. G. W. Tryon, Jr.

M. rivicola, Sowerby. (Sp.)

Pholas rivicola, Sowerby, Zool. Proc. 1849. Sowerby, Monog. Pholas. Thes. Conch. ii. p. 496, t. 108, f. 90, 91. Adams and Reeve, Moll. Voy. Samarang. p. 84, t. 23, f. 5.

Martesia rivicola, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 384. H. and A. Adams, Genera, ii. p. 331. Fischer, Journ. Conch. 2d ser. iii. p. 52.
Hab.—Pantai River.
This very distinct species is found burrowing in floating piles, on the Pantai River, twelve miles from its mouth, where the water is perfectly fresh.

M. striata, Linnæus. (Sp.)

Pholas striata, Linnæus, Syst. Nat. p. 1111. Beau, Cat. Coq. Guadaloupe, p. 27. Bosc, Hist. Nat. des Coq. ii. p. 195. Brown, Ill. Brit. Conch. p. 115, t. 49, f. 5—8. Catlow, Conch. Nomenc. p. 4. Chemnitz, Conch. Cab. t. 102, f. 867—871. Donovan, Brit. Shells, t. 116. Forbes and Hanley, Brit. Conch. i. p. 120. Gualtieri, Test. t. 105, f. F. Dillwyn, Desc. Cat. p. 37. Gmelin, Syst. Nat. p. 3215. Hanley, Desc. Cat. p. 7. Jay, Cat. 4th ed. p. 10. Mawe, Conch. t. 3, f. 1. Menke, Syn. p. 73. Montagu, Brit. Test. pp. 26 and 559. Reeve, Conch. Syst. t. 24, f. 2. Rumphius, Mus. t. 46, f. 8. Sowerby, Genera Pholas, f. 2. Sowerby, Illust. Brit. Shells, t. 1, f. 13. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 494, t. 104, f. 40—42. Spengler, Besch. Berl. Naturg. iv. t. 5, f. 1—5. Thorpe, Brit. Mar. Conch. p. 31. Wood, Gen. Conch. p. 83, t. 16, f. 1, 2, 3, 4, 8. Wood, Index Test. Pholas, t. 2, f. 7. Turton, Conch. Dict. p. 147. Turton, Conch. dith. Brit. p. 11.

Martesia striata, Leach, Gray Ann. and Mag. Nat. Hist. 2d ser. viii. p. 384. H. and A. Adams, Genera, iii. t. 90, f. 5, 5*a*. Chenu, Man. Conch. ii. f. 48—50. Fischer, Journ. Conch. 2d ser. iii. p. 52. Mörch, Cat.—p. 2. Woodward, Manual, t. 23, f. 21.

Pholas pusilla, Linnæus, Syst. Nat. p. 1111. Bosc, Hist. Nat. des Coq. ii. p. 195. Catlow, Conch. Nomenc. p. 4. Dillwyn, Desc. Cat. i. p. 38. D'Orbigny, Moll. Voy. Amer. Merid. p. 497. D'Orbigny, Moll. Sagra's Cuba, p. 214. Donovan, Brit. Shells, iv. t. 117. Schumacher, Essai d'un Nov. Syst. p. 96. Spengler, Skrivt. Nat. ii. pt. 1, p. 95.

Pholas clavata, Lamarck, Anim. sans Vert. v. p. 446. Lamarck, (ed. Desh.) vi. p. 46. Anton, Verzeichn. Conch. p. 1. Bruguierè, Encyc. Meth. t. 170, f. 1—3. Hanley, Desc. Cat. p. 7.

Martesia clavata, Swainson, Malacol. f. 122, I.

Pholas conoides, Fleming, Brit. Anim. p. 457.

" *lignorum*, Spengler, Berl. Ges. Nat. iv.

" *nana*, Pultney, Dorset. Cat. p. 27.

" *falcata*, (*Junior*,) Wood, Gen. Conch. t. 16, f. 5—7. Wood, Index Test. Pholas. t. 2, f. 8? Hanley, Desc. Cat. p. 7.

" *teredinifórmis*, (*Junior*,) Sowerby, Zool. Proc. 1849. Sowerby, Mon. Pholas. Thes. Conch. ii. p. 490, t. 108, f. 97, 98.

Pholas semicostata, (Junior,) Lea, Bost. Proc., Nov., 1844, t. 24, f. 1. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 495, t. 108, f. 84, 85. Jay, Cat. 4th ed. p. 10. Stimpson's Check List.

Coll. Acad. Nat. Sci.; specimens from England, West Indies and Philippines. Coll. J. C. Jay, M. D. Coll. Isaac Lea, LL.D. Coll. G. W. Tryon, Jr.

Linnæus described the West Indian shell as a distinct species, under the name of *Pholas pusilla*, but Lamarck united the two, as *P. clavata*; *P. Teredinifórmis* and *P. falcata* are about half-grown shells, and *P. semicostata* is a very young individual. The Philippine Island specimens do not differ in any respect from the West Indian. This species differs from M. cuneiformis in the shape of the dorsal plate and in the anterior concentric striæ being angular instead of regularly curved.

M. corticaria, Adams. (Sp.)

Pholas corticaria, Gray, MSS. Sowerby, Monog. Pholas, Thes. Conch. ii. p. 495, t. 108, f. 94—96. C. B. Adams, Contrib. to Conch. p. 75.

Pholas Beauiana, Recluz, Journ. Conch. iv. p. 49, t. 2, f. 1, 2, 3. (1853.)

Zirphæa Beauiana, H. and A. Adams, Genera, ii. p. 327. Beau. Cat. Coq. Guadaloupe, p. 27. Fischer, Journ. Conch. 2d ser. iii. p. 50.

Pholas Caribæa, D'Orbigny, Moll. Sagra's Cuba, p. 216, t. 25, f. 20—22, 1853.

" *Hornbeckii*, D'Orb. " " " p. 217, t. 25, f. 23—25, 1853.

Martesia Hornbeckii, Chenu, Manuel, ii.

Hab.—West Indies.

The *Pholas Beauiana*, of Recluz, and *P. Caribœa*, D'Orb., are descriptions of the full growth of this shell. *P. Hornbeckii* is a young shell, and is considerably magnified in the plate of Sagra's Cuba, although no reference to that fact is contained there. The shell is figured without the dorsal plate.

The date 1846 is affixed to the descriptions by D'Orbigny, but he does not mention where they were described previously.

This shell was sent to England from Jamaica, by Prof. Adams, with the MSS. name of *P. rosea*, subsequently altered to P. corticaria. Mr. Hanley affirmed them to be a variety of P. striata, and, in deference to his opinion, Adams suppressed the description.

Sowerby quotes "Gray MSS." for this shell, but Dr. Gray relinquishes his name in favor of Adams, although he considers the shell a synonym of M. cuneiformis. I have not seen this species, but conceive from the figures of Sowerby that it is a good one.

I find the following differences in the dorsal plates of the three allied West Indian species:—

In striata, somewhat hexagonal, the anterior and posterior margins emarginate, the anterior lateral margins slightly concave, and the posterior lateral margins somewhat convex.

In cuneiformis, diamond-shaped, the anterior portion broader and more obtuse.

In corticaria, broadly halberd-shaped, truncate and three-sided at the posterior end, with the central margin emarginate.

Addenda.

Pholas cordata, Schröter, Conch. iii. p. 544, t. 9, f. 22—24. Bosc, Hist. Nat. des Coq. ii. p. 196. Bruguierè, Encyc. Meth. t. 169, f. 8—10. Catlow, Conch. Nomenc. p. 3. Gmelin, Syst. Nat. p. 3216. Wood, Gen. Conch. p. 85. Wood, Index Test. f. 9.

Hab. ——— ? Two specimens found in a mass of Madrepore.

I am not able to place this shell in any of the foregoing genera. It appears to be immature, and it is probable that the anterior ventral hiatus is closed in the adult by a callous plate, as in Martesia, etc.; but it differs from that genus in the single dorsal plate being placed anterior to, instead of over, the umbones.

Gray, Adams and Sowerby do not mention the species. Should this species be rediscovered, and found to exhibit the above distinctive characters, as indicated by Schröter's plate, I would suggest for it the generic name SCHROTERIA, in honor of its describer.

From Proceedings of the Academy of Natural Sciences of Philadelphia, September, 1862.

Notes on American Fresh Water SHELLS, with descriptions of two new Species.

BY GEO. W. TYRON, JR.

VIVIPARIDÆ, H. & A. Adams.

VIVIPARA, Montfort, 1810.

The following sub-genera of Vivipara inhabit the United States:

TULOTOMA, Haldeman. Shell heavy and nodulous, opercle corneous and concentric; animal with the habit of Anculosa.

Example. V. magnifica, Conrad.
V. bimonilifera, Lea.

MELANTHO, Bowdich, 1822. Shell oval, solid, sub-umbilicate or entirely covered. Whorls smooth, aperture oval. Color uniform.

Examples. V. ponderosa, decisa, etc.

HALDEMANIA, Tryon, 1862. Shell subcarinate, operculum with a paucispiral nucleus, the accretions becoming concentric with age.

Example. V. subcarinata, Say.

There are several species of typical Viviparæ inhabiting our Western waters, all of which are entirely distinct from European species.

V. lineata, Valenc. (sp.)

Paludina *lineata*. Valenciennes. Rec. d'Obs. de Zool. par Humboldt et Bonpland, ii. p. 255, 1833.—Küster, Martini and Chemn. Conch. Cab. Monog. of Paludina, p. 10, 19, t. 2, f. 6—9; t. 4, f. 4. 1852.

" *vivipara*, Say, in Nicholson's Encyc. 3d. (American) Edit. t. 2, f. 5, 1819. Haldeman, Monog. p. 17, t. 6.

This shell differs from the vivipara of Europe in possessing four spiral red bands, whilst the latter has but three. An examination of hundreds of specimens from various portions of the Western States, and from Europe has convinced me that the difference is permanent.

V. intertexta, Say.

This shell has occasionally, distinct red revolving bands, four in number. I have a number of specimens from Davenport, Iowa, (Prof. Sheldon); and Mr. Binney has one from Rock River, Illinois; they differ from the New Orleans specimens in the umbilicus being more open.

V. subpurpurea, Say.

V. Texana, Tryon.

T. solidâ, conicâ, pallide virente; spirâ elongatâ, suturâ valde impressâ, apice obtusâ; anfractibus senis, paulo-convexis, aperturâ suborbiculatâ, parvâ, 2—5 totius altitudinis æquante.

Length $1\frac{1}{8}$ inch, breadth $\frac{3}{4}$ inch. First five whorls of the spire equal in length to the aperture.

Hab.—Texas.

Coll. Acad. Nat. Sci. Coll. G. W. Tryon, Jr.

Shell solid, narrowly conic, consisting of six whorls, which are somewhat flattened around their upper portion; sutures well impressed. Aperture suborbicular, equalling 2-5ths of the length

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of the shell. Umbilicus covered. Epidermis light green with faint red revolving bands.

This shell most resembles V. subpurpurea, but is easily distinguished by having six whorls, which are much narrower than in that species. The spire is almost double the length of that of subpurpurea, and the epidermis is lighter in color.

V. subsolida, Anthony. Proc. Acad. Nat. Sci. p. 71, 1860.

Through the kindness of Prof. D. S. Sheldon, of Davenport, Iowa, I have received a number of specimens of this shell and of V. integra, Say, from the Mississippi River at that place. The latter reaches the size of subsolida, which it much resembles, but it is easy to separate them by the following distinctive characters:

V. subsolida.

Spire *longer* than the aperture, consisting of *seven* whorls, acuminate. Body whorl *subangulated* near the middle, the angle being quite conspicuous in half-grown shells.

V. integra.

Spire *shorter* than the aperture, consisting of *six* or occasionally six and a half whorls. Body scarcely angulated, being almost regularly convex. Shell much more ventricose than subsolida.

V. ponderosa, Say.

May be readily distinguished from V. integra by its shorter spire, much more ventricose form, and by the body whorl being almost flat in the centre, so that its lateral sides for some distance are almost parallel. The shoulder of the whorls is also more prominent than in either of the other specimens.

AMNICOLIDÆ, Tryon, 1862.

AMNICOLA, Gould and Haldeman.

There are two very distinct groups of shells included by authors in this genus; in the first, which may be considered typical, the shells are globose, with a short spire of three or four whorls; the second I propose to separate as a subgenus, which may be thus characterized:

Subgenus POMATIOPSIS, Tryon, 1862.

Shell elongate, the spire (of about six whorls) much exceeding the length of the aperture.

Example. A. lapidaria, Say.

A. depressa, Tryon.

T. orbiculatâ, subhyalinâ; anfractibus quarternis, convexis; ultimo magno, 5—6 totius longitudinis æquantè, angustè umbilicatâ. Aperturâ semi-circulari; labio interne appresso. Suturâ impressâ. Long. 4 mill. Lat. 4 mill.

(Figure magnified 2½ times.)

Hab.—Mississippi River at Davenport, Iowa. Prof. Sheldon. Coll. Acad. Nat. Sci., Smithsonian Inst., and of Prof. D. S. Sheldon, Isaac Lea, J. G. Anthony, and Geo. W. Tryon, Jr.

Shell subhyaline, rather solid, orbicular; spire depressed, consisting of nearly four whorls; apex acute, suture profoundly impressed. Body whorl very convex, equalling 5-6ths the total length of the shell, narrowly umbilicate. Aperture semi-circular, the inner lip being nearly straight.

The only shell which this resembles is V. subglobosa, Say, which is, however, double the size of A. depressa, with a rather more exserted spire, and more concave inner lip.

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Monograph of the Family TEREDIDÆ.

BY GEORGE W. TRYON, JR.

The following is the third and concluding paper of a series,* designed to comprehend all that is at present known, regarding the curious group of shells included in Blainville's Order Pholadacea:—

In the preparation of these papers much difficulty has arisen from the number of species which have been described (sometimes inadequately) but not figured, and from the conflicting views of European naturalists regarding the validity of many species. There is no good reason why the Pholadaceæ should not be searched for, and distributed very generally in public and private cabinets, yet such is not the case, and every conchologist who studies the order labors under the disadvantage of being unable to examine and compare specimens, of a large number of the species. Greatly as the number of species have been increased by modern research, it is evident, from the general diffusion of the order throughout the world, and from the incompleteness of our researches in those regions, which appear most to abound in them, and also from the number of new species in one of the families discovered recently in England alone, that the number at present known must be indeed a very small proportion of those which future investigations will probably reveal to us.

If these pages shall direct attention to the collection and study of the Pholadaceæ, and furnish an approximate idea of the amount of the previous labors of conchologists, they will have answered their purpose. Should *materiél* be placed at my disposal for a more perfect study of these shells, a complete illustrated monograph will be published at some future time. To further this end, collectors are earnestly requested to send to me (in exchange), specimens from all duly authenticated localities, together with such facts in relation to them as may come to their knowledge, and such assistance will be fitly acknowledged in the proposed publication.

Sellius was the first naturalist who studied the species of Teredo, and his work on their natural history is a model of accuracy in most particulars, going far in advance of all other treatises on the subject which appeared for many years afterwards.

So little did Linnæus and his immediate followers know of the species of Teredo, that they included a number of species under the name of *T. navalis*, which is published with such a general description as will suit all the species now known, or hereafter to be added to the genus! Lamarck did not add much to our knowledge of these shells, and Dr. Gray has merely given us at two widely-extended periods, lists of the species, one or two descriptions, and some interesting and important investigations regarding the shell of *Kuphus arenarius*. Conchology is deeply indebted to the following naturalists for a large portion of our knowledge of the family: Blainville, who published a number of new species in the "Dict. des Sciences Naturelles." Deshayes, who has given us extended anatomical descriptions in the Mollusca of the Scientific Exploration of Algiers. Fischer, a Monograph of the family in "Journ. Couch., 2 ser., vol. i." Turton, for several new species. And more especially to Mr. Gwyn Jeffreys for his accurate diagnoses of new British species, and to Mr. Hanley for the splendid descriptions which he has published in the "History of British Mollusca."

I have endeavored, as far as possible, in the present paper to separate the species by distinctive characters, but their value is seriously impaired in this family by the fact that, unlike the Pholadidæ, the specific distinctions are not

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* "Synopsis of the Recent Species of Gastrochænidæ, a Family of Acephalous Mollusca."—Proc. Acad. Nat. Sc., Dec., 1861.

"On the Classification and Synonymy of the Recent Species of Pholadidæ."—Proc. Acad. Nat. Sc., April, 1862.

always founded on the shell, but sometimes, where the shells of two species are undistinguishable from each other, their tubes or pallets may afford considerable differences. The pallets alone as will be seen indicate two distinct genera, where the valves do not differ. Hence it is necessary, in many cases, for a certain determination of the species, that the valves, tube, and pallets shall each be examined, and it is needless to expatiate on the confusion which would arise from the accidental commingling of the tubes or pallets of one species with the valves of another; and this confusion is more apt to occur when, as is not unfrequently the case, several species are found inhabiting the same piece of wood, and being broken in their extraction, the pallets and valves fall out indiscriminately intermingled.

Another difficulty in the study of the Teredidæ is the great variation of the individuals in size, proportions, and markings, making an accurate diagnosis a simple impossibility, and compelling us to rely on a *general accordance* with descriptions in the most material points. Mr. Hanley remarks that "there is one fact with regard to the shipworms, which has rendered their investigation peculiarly laborious, namely, that no reliance can be placed upon the relative proportions of their several parts for specific definition. If we take at random about fifty valves of Norvagica, for instance, we shall find that in some the oblique decussated striæ occupy twice the space of the succeeding strip, in others this is reversed, in many these are both contracted, and a large posterior smooth area is exhibited; in others again almost the entire surface is occupied by the two former, to the great diminution of the hinder portion. Hence it is absolutely necessary to examine very numerous examples in order to elicit the real and permanent specific characters, and the valves alone are rarely adequate for the determination of the species."

Dr. Gray proposed, in 1851, to consider the Teredines a subfamily of Pholadidæ, but Mr. P. P. Carpenter has separated them under the name of Teredidæ, with great propriety, as they undoubtedly exhibit sufficient differences from the Pholades, and from all other Mollusca, to be entitled to the position of a family.

I have already given (in Proc. A. N. S., April, 1862) a sketch of the division of Teredidæ into three subfamilies, which it will be necessary to reproduce here:—

Family *TEREDIDÆ.*

Animal elongate, subcylindrical, siphons united nearly to the end, their extremities armed with two shelly styles; (Pallets.) foot long and narrow, protruded through the united mantle lobes, which are thickened in front. Gills long; mouth with palpi. Shell, when present, globular, tripartite, included with the animal in a more or less cylindrical testaceous tube, the siphonal end of which is divided into two by a longitudinal partition.

Subfamily 1. Teredinæ. Valves present, free, contained in the tube, which is irregularly cylindrical, sometimes much contorted. Perforating timber.

Subfamily 2. Terediniæ. Valves with an accessory anterior dorsal plate, their margins prolonged into a shelly tube when adult.* Tube frequently concamerated; siphonal extremity often truncate, and the opening contracted by a six-lobed internal margin (*fossil*).

* Dr. Gray supposes the fossil genus Teredina to be more closely connected with Pholadidæ than with Teredidæ, from the fact that the shell has an accessory dorsal plate, and is external to the tube. It must be confessed that the genus is curiously related to all three families; the external position of the valves, and the lobed end of the tube, exhibiting an approach to the Gastrochænidæ. I have concluded to place it for the present in Teredidæ, in a position where it may indicate a transition from the free and perfect valves of Teredo, through its less important valves eventually becoming merely a portion of the tube, to the Kuphus, where the valves are entirely wanting, or are replaced by the cleft shelly plate which closes the lower end.

Subfamily 3. KUPHINÆ. Without valves. Tube clavately cylindrical, sunk horizontally in sand. Never penetrating timber.

Synopsis of Genera.

Subfamily TEREDINÆ.

Tubes elongate, nearly cylindrical, increasing slowly in diameter, solitary; pallets simple; valves generally nearly as broad as their length.....Genus TEREDO, Linn.

Tubes club-shaped, much contorted, growing together in masses, and increasing rapidly in diameter; pallets simple; valves narrow and elongate.....Genus UPEROTIS, Guettard.

Tubes elongate, increasing slowly in diameter, solitary; pallets compound, the blade penniform, composed of a number of jointed setæ; valves nearly as broad as their length.....Genus XYLOTRYA, Leach.

Subfamily TEREDINIDÆ.

(*Fossil.*)

Subfamily KUPHINÆ.

Tubes penetrating sand, somewhat irregular, very large, "pierced around the base with small scattered perforations; and inclosed by two overlapping convex septa, arising from the sides and completely closing the ends" (*Gray*)....Genus KUPHUS, Guettard.

Index to Species of TEREDIDÆ.

Bruma delle Navi, Vallisnieri, = Teredo Norvagica, Spengler
dell' Oceano, Vallisnieri, = Teredo megotara, Hanley.
Cuphus arenarius, Gray, = Kuphus arenarius, Linn.
Dentalium navis, Linn. = Teredo navalis, Linn.
Fistulana corniformis, Lam. = Teredo Norvagica, Spengler.
gregaria, Blainv. = Uperotis clava, Gmelin.
gregata, Lam. = Uperotis clava, Gmelin.
Furcella gigantea, Gray, = Kuphus arenarius, Linn.
Guetera clava, Gray, = Uperotis clava, Gmel.
corniformis, Gray, = Teredo Norvagica, Spengler.
Kuphus arenarius, Linn.
Leptana arenaria, Gray, = Kuphus arenarius, Linn.
Pholas Teredo, Müll. = Teredo nana, Turton.
Septaria arenaria, Lam. = Kuphus arenarius, Linn.
gigantea, Chenu, = Kuphus arenarius, Linn.
Mediterranea, Matheron, = Teredo Norvagica, Spengl
Serpula anguina, *b*. Gmelin, = Kuphus arenarius, Linn.
gigantea, Schröter, = Kuphus arenarius, Linn.
polythalamia, Linn. = Kuphus arenarius, Linn.
retorta, Mawe, = Uperotis clava, Gmelin.
Teredo, Da Costa, = Teredo Norvagica, Spengler.
Solen arenarius, Rumphius, = Kuphus arenarius, Linn.
corrugatus, Klein, = Kuphus arenarius, Linn.
Teredo arenaria, Gray, = Kuphus arenarius, Linn.
Teredo *Batavus*, Spengler, = Teredo navalis, Linn.
Teredo bipalmulata, Chiaje, = Xylotrya minima, Blainv.
" Lam. = Xylotrya palmulata, Lam.
" Thompson, = Xylotrya fimbriata, Jeffreys
bipartita, Jeffreys.

Teredo Bruguierii, Chiaje, = Teredo Norvagica, Spengler.
campanulata, Desh. = Xylotrya Stutchburyi, Leach.
carinata, Leach, = Xylotrya bipennata, Turton.
clava, Gmel. = Uperotis clava, Gmel.
corniformis, Gray, = Teredo Norvagica, Spengler.
denticulata, Gray, = Teredo nana, Turton,
Deshaii, Quatref. = Teredo Norvagica, Spengler.
dilatata, Stimpson.
divaricata, Desh.
elongata, Quatref.
excavata, Lukis.
fatalis, Quatref. = Teredo Norvagica, Spengler.
fusticulis, Jeffreys.
gigantea, Home, = Kuphus arenarius, Linn.
gregata, Desh. = Uperotis clava, Gmel.
malleolus, Turton.
marina, Sellius, = Teredo navalis, Linn.
Mediterranea, Catlow, = Teredo Norvagica, Spengler.
megotara, Hanley.
minima, Blainv. = Xylotrya minima, Blainville.
nana, Turton.
" (*part.*) Gray, = Teredo megotara, Hanley.
navalis, Brit. Authors, = Teredo Norvagica, Spengler.
" Home, = Xylotrya bipennata, Turton.
" Linn.
" Möller, = Teredo nana, Turton.
" Spengler, = Xylotrya Stutchburyi, Leach.
navium, Sellius, = Teredo Norvagica, Spengler.
nigra, Blainv. = Teredo Norvagica, Spengler.
Norvagica, Thompson, = Teredo Norvagica, Spengler.
Norvagica, Spengler.
" *var.* Jeffreys, = Teredo divaricata, Desh.
nucivorus, Spengler, = Uperotis clava, Gmel.
Oceani, Sellius, = Teredo megotara, Hanley.
palmulata, Leach, = Xylotrya pennatifera, Blainv.
" Lam. = Xylotrya palmulata, Lam.
" Philippi, = Xylotrya minima, Blainv.
pedicellata, Quatref.
pennatifera, Blainv. = Xylotrya pennatifera, Blainv.
Petitii, Recluz, = Teredo elongata, Quatref.
Philippii, Gray, = Xylotrya minima, Blainv.
Senegalensis, Blainv.
" Fischer, Teredo elongata, Quatref.
" Laurent, = Teredo Norvagica, Spengler.
serratus, Desh. = Xylotrya minima, Blainv.
spatha, Jeffreys.
Stutchburyi, Leach, = Xylotrya Stutchburyi, Leach.
subericola, Macgillivray.
thoracites, Gould.
truncata, Quatref.
utriculus, Gmel. = Teredo Norvagica, Spengler.
vulgaris, Lam. = Teredo navalis, Linn.
Uperotus clava, Gmel.
corniformis, Adams, = Teredo Norvagica, Spengler.
Xylotrya *bipalmulata*, Lam. = Xylotrya palmulata, Lam.
bipennata, Turton.
carinata, Gray, = Xylotrya bipennata, Turton.

Xylotrya fimbriata, Jeffreys.
cucullata, Norman.
minima, Blainv.
palmulata, Hanley, = Xylotrya fimbriata, Jeffreys.
" Lam.
pennatifera, Blainv.
Philippii, Adams, = Xylotrya minima, Blainv.
Stutchburyi, Leach.

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Turton.....Conchological Dictionary, 1819. Conchylia dithyra Brit., 1822.
Tufts.....Proc. Essex Inst., i. p. 26.
Vallisnieri.....Op. Phys. Med., ii.
Voigt.....Cuv. Thierr, iii.
Walch.....Naturgforsch, x. p. 38.
Wheatley, C. M.....Catalogue of Shells of United States, 1842.
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Synonymy and Descriptions.

Order PHOLADACEA.

(Family 1. *PHOLADIDÆ.*)

(Family 2. *GASTROCHÆNIDÆ.*)

Family 3. *TEREDIDÆ*, Carpenter.

TEREDIDÆ, Carpenter, Lectures on Mollusca, p. 100.

Teredina, (part.) Sieb. Lehrb. vgl. Anat., p. 235.
Teredinadæ, (part.) Fleming, Hist. Brit. Anim., p. 454.
Teredinidæ, (part.) Fleming, Hist. Brit. Anim., p. 409.
Pholadidæ, (part.) Gray, Zool. Proc., 1847, p. 187. Gray, Ann. and Mag. Nat. Hist, 2d ser. viii. p. 381. Woodward, Manual, p. 327. Adams, Genera, ii. p. 323.

Pholadaria, (part.) Lamarck, Phil. Zool., 1809. Lamarck, Extr. d'un Cours., 1812. Lamarck, Anim. sans. Vert. vi. 441. Hanley, Desc. Cat., p. 5. Sowerby, Conch. Man., p. 224.
Pholadariæ, (part.) Latreille, Fam. Nat.
Pholadea, (part.) Anton, Versuch., p. 1. Menke, Synopsis, p. 121, 2d edit.
Pholadeæ, (part.) Menke, Syn., p. 73, 1st edit.
Pholades, (part.) Ferussac, Tabl. Syst.
Pholadina, (part.) Milne-Edwards, Conch., p. 203.
Pholadoidæ, (part.) Agassiz, Nomenclator Zool.
Pholadria, (part.) Sism., Syn. An. Foss.
Pholedariæ, (part.) Brown, Syst. urw. Conch.
Pholidæ, (part.) Swainson, Elements et Malacology.
Pholidæa, (part.) Leach, teste Swainson, Malacology.
Adesmacea, (part.) Blainville, Malacol., p. 577.

Subfamily 1. TEREDINÆ, Tryon.

Teredinæ, Tryon, Proc. Acad. Nat. Sciences, p. 193, April, 1862

Teredina, (part.) Gray, Zool. Proc., 1847, p. 188.
Teredinina, (part.) Gray, Ann. and Mag. Nat. Hist., 2d ser. viii. p. 386.
Teredininæ, (part.) Adams, Genera, ii. p. 331. Chenu, Man. Conchyl. ii. p. 10

Genus TEREDO, Linnæus.

Teredo, Linn., Syst. Nat. edit. 10, p. 651; id. edit. 12, p. 1267. Adams, Genera, ii. p. 331. Adanson, Senegal, Coquillages, p. 263. Adanson, Hist. de l'Acad., 1759. Blainville, Dict. Sc. Nat. lii. p. 259. Bosc, Conch. ii. p. 197. Brown, Conch. Gt. Brit. p. 116. Bruguierè, Encyc. Meth. i. p. 12. Burrows, Conch. p. 124. Catlow, Conch. Nomenc. p. 2. Chenu, Man. Conchyl. ii. p. 10. Chenu, Encyc. Hist. Nat. p. 233. Crouch, Introd. Lamarck's Conchology, p. 6. Cuvier, Regne Anim. edit. 1, ii. p. 493; id. edit. 2, iii. p. 159; id. edit. Griffith, xii. p. 123; id. edit. Audouin, Moll. p. 232. Cuvier, Ann. du Mus. xix. 1812. Cuvier, Tabl. Elem. p. 432. Cuvier, Anat. Comparit., 1800. Dekay, Moll. N. Y., p. 249. Delle Chiaje, Mem. iv. p. 21. Deshayes, Moll. Expl. Algerie, p. 35. Deshayes, Ann. des Sc. Nat., 2d ser. xi. p. 247. Deshayes, Traitè Elem. i. pt. 2, p. 47. Deshayes, Encyc. Meth. iii. p. 1002. Dillwyn, Desc. Cat., p. 1087. D'Orbigny, Moll. Sagra's Cuba, p. 210. D'Orbigny, Pal. Fran. Terr. Cret., iii. Eichwald, Faun. Caspio-Caucasica. Ferussac, Tabl. Syst., p. xlv. Fischer, Journ. Conch., 2d ser., i. p. 129. Fleming, Brit. Anim. Forbes and Hanley, Brit. Moll., i. p. 58. Frey and Leuckart, Beitr. z. kenntn. Wirbel. p. 46. Georgi, Beschr. Rüss. Thierr. iii. Gerville, Cat. Coq. de la Manche. Gmelin, Syst. Nat., p. 3747. Gould, Invert. Mass., p. 26. Gould, Bost. Proc., vi. p. 15, and Otia Conchologica, p. 222. Goldfuss, Zool., p. 613. Gray, London Med. Repository, xv. p. 237. Gray, Syn. Brit. Mus., p. 76, 91, 1842; id. Philos. Mag., 1827, p. 410; id. Ann. and Mag. Nat. Hist., 2d ser., viii. p. 381. Guerin, Iconog. du Reg. Anim. Hanley, Desc. Cat., p. 3. Hanley, Shells of Linn. p. 450. Heinrich, Medizinische Zeit., p. 372. Home, Phil. Trans., 1806, p. 270. Home, Lect. Anat., t. 81, f. 4, 5. Humphrey, Conch. Jay, Cat., 4th edit., p. 9. Jeffreys, Ann. and Mag. Nat. Hist., 3d ser., vi. p. 121. Kammerer, Cab. Rudolst, p. 7. Karsten, Mus. Leskeanum, p. 308. Kurtz, Cat., p. 3. Lamarck, Prodr., p. 90; id. Syst. p. 129, 1801; Phil. Zool.; id. Anim. sans Vert., v. p. 438, and 2d edit., vi. p. 35. Laurent, Journ. Conchyl., i. Löven, Index Moll. Scand., p. 50. Matheron, Ann. des Sc. du Midi, France, i. and ii. Maton and Rackett, Linn. Trans., viii. p. 249. Menke, Syn. Meth., ed. 2, p. 122. Mawe, Conch., p. 197. Middendorff, Mal. Rossica, iii. p. 79. Möller, Moll. Grœnland.

Montagu, Test. Brit., p. 7. Nyst, Foss. Belg., p. 38. Oken, Zool., p. 216. Oken, Allg. Naturg., vi. p. 274. Osler, Phil. Trans., 1826. Pallas, Misc. Zool. Pallas, Reise, Süd. Russ., p. 418. Pallas, Tabl. Phys., p. 40. Payraudeau, Coq. de la Corse, p. 26. Pennant, Brit. Zool., iv. p. 147. Philippi, Enum. Moll. Sicil., i. p. 2, and ii. p. 3. Pliny, Hist. Nat. lib., xxi. Cap. 80. Poli, Test. utr. Sicil. Potiez et Michaud, Gallerie des Moll., ii. p. 270. Pultney, Dorset. Cat. Quatrefages, Ann. Sc. Nat., 3d ser., xi. p. 21. Rang, Manuel, p. 346. Recluz, Rev. et Mag. Zool., 2d ser., i. p. 64. Reeve, Conch. Syst., p. 37. Roissy, Moll., vi. p. 454. Scacchi, Cat. Coq. Reg. Neap., p. 8. Schröter, Einleit, ii. p. 571. Schumacher, Essai d'un Nov. Syst., p. 94. Schweigg, Natürg. p. 699. Sellius, Commerc. Liter. Nov., p. 409. Sellius, Hist. Nat. Teredinis. Sowerby, Genera. Sowerby, Conch. Man., ed. 1, p. 5; ed. 2, p. 272. Sowerby, Illust. Brit. Shells, t. 1. Spengler, Skrivt. Nat., ii. pt. 1, p. 99. Stimpson, Bost. Proc., iv. p. 113. Stimpson, Shells, N. E., p. 26. Swainson, Malacol., p. 364. Thompson, Ann. and Mag. Nat. Hist., xx. p. 174 Thompson, Edinb. Phil. Mag., xviii. p. 121. Thorpe, Brit. Mar. Conch., p. 27. Turton, Conch. dithyra, p. 13. Tufts, Proc. Essex Inst., p. 26. Wheatley, Catalogue. Woodward, Manual, p. 329.

Serpula, Da Costa, Brit. Shells, p. 21.

Fistulana, (part.) Lamarck, Anim. sans. Vert., v. p. 438; id. 2d edit., vi. p. 35. Blainville, Dict. Sc. Nat., xvii. p. 82. Blainville, Mal., p. 579. Favanne, Conchyl. Chenu, Man. Conchyl., ii. p. 12.

Guetera, (part.) Gray, Ann. and Mag. Nat. Hist., 2d ser., viii. p. 361.

Uperotis, (part.) Adams, Genera, ii. p. 333.

Bruma, Vallisnieri, Op. Phys. Med., ii.

Pholas, (part.) Müller, Prodr. Zool. Dan., p. 251. Fabricius, Fauna Groen., p. 427.

Dentalium, (part.) Linnæus, Faun. Suec. 380.

Ligniperda, Sellius.

Xylophagus, Gronovius, Zooph. p. 258. Sellius.

Solen, Klein, De Tub.

Siphonium, (part.) Browne.

Species.

a. *Valves externally smooth and glossy, or regularly transversely striated.*

T. b i p a r t i t a, Jeffreys.

T. b i p a r t i t a, Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 123.

Hab.—"In cedrela odorata (or West India Cedar.), thrown ashore, perhaps by the gulf stream, at Guernsey, with T. spatha."—*Jeffreys.*

Description.—"Tube ——— ? valves oval, thin, compressed, covered with a brownish epidermis; body smooth and glossy; anterior auricle moderately developed, angle rather obtuse, striæ very numerous and crowded; posterior auricle rounded, small but prominent, appressed to body, apex placed below the crown, internal margin indistinct; fang narrow and pointed; tubercle small; apophysis narrow. Pallets resembling those of T. p e d i c e l l a t a, but longitudinally divided into two equal parts by a deep furrow; stalk cylindrical, rather longer than pallet.

Dimensions.—"Length (of valves) 4-20ths; breadth 3-20ths."—*Jeffreys.*

T. e x c a v a t a, Lukis.

T. e x c a v a t a, Lukis, MSS. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 123.

Hab.—"In drift fir. Guernsey and Sussex. Rare."—*Jeffreys.*

Description.—"Tube short, rather solid, and detached from the wood, slightly curved, jointed at intervals, with a very few transverse wrinkles at the opening, and an indistinct siphonal ridge. Valves roundish oval, thin, compressed;

body glossy, marked with distant, but regular and fine, striæ or impressed lines; anterior auricle placed nearly at a right angle with the insertion of the fang, striæ rather numerous and waved; posterior auricle dilated and somewhat reflected, apex nearly on a level with the crown or umbo of the valve, inner margin free and well defined; tubercle slight, and not visible when the valve is in a supine position; fang obtuse; apophysis thin and narrow. Pallets long and narrow, bifid in front to nearly half their length, with two corresponding tubular cavities which terminate in separate points like the prongs of a steel fork; underneath they are abruptly sloped towards the bifurcate points, and closely striated in a longitudinal direction; stalks near as long as pallets, pointed at one end and at the other merging into the pallets.

Dimensions.—Length (of valves) 7-20ths; breadth 4-20ths."—*Jeffreys.*

T. fusticulus, Jeffreys.

T. fusticulus, Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 125.

Hab.—In Cedrella odorata from Leith.

Description.—"Tube short and straight, with a slight calcareous lining, which is not easily separated from the wood. It is thickened internally at the opening, and has a few transverse wrinkles in that part.

Valves round, thin, compressed, body smooth, glossy, white under a brown epidermis; anterior auricle of moderate size, angle about 50°, striæ numerous; posterior auricle round expanded and appressed to body, internal edge well defined; fang broad, obtuse; tubercle small and sunk; apophysis thin and narrow. Pallets club-shaped, formed of several transverse layers, and externally tuberculate; stalk twice the length of pallet.

Dimensions.—Length (of valve) 4-20ths; breadth nearly as much."—*Jeffreys.*

T. spatha, Jeffreys.

T. spatha, Jeffreys. Ann. and. Mag. Nat. Hist. 3d ser. vi. p. 124.

Hab.—With T. bipartita, in Cedrela odorata, at Guernsey.

Description.—"Tube rather long and flexuous, detachable, regularly jointed, increasing rapidly from the extremity, inside which there are a few transverse wrinkles and a sharp, but short, siphonal ridge.

Valves, triangular, compressed, rather solid; body smooth; anterior auricle large, angle about 50°, striæ exceedingly numerous and fine; middle area unusually large and rounded and appressed, internal margin indistinct; fang narrow and pointed; tubercle small and sunk; apophysis narrow. Pallets spade-shaped, in the young state calyciform; stalk of the same length as pallet.

Dimensions.—Length (of valves) 6-20ths; breadth nearly as much. A pair of pallets is in the British Museum, from Miss Saull; and another pair is in the collections of Natural History at the Jardin des Plants. The localities of both the last-mentioned specimens are unknown."—*Jeffreys.*

T. subericola, Macgillivray.

T. subericola, Macgillivray, Mss. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 122.

Hab.—Great Britain.

Description.—Tube rather thin, and adherent to wood, short, of the form of an elongated cone curved at the opening, with internal irregular transverse septa, which are close-set at the extremity.

Valves oval, rather convex, thin; body smooth and somewhat glossy; anterior auricle short, angle obtuse, striæ rather numerous; posterior auricle narrow, falciform, reflected at the outer edge, with its apex raised above the crown; tubercle strong and prominent; fang long, narrow, and incurved; apophysis rather broad. Pallets short, pear-shaped, compressed, and expanded towards the anterior margin, with a semilunar depression in the middle and a longitudinal groove in front; stalk short and pointed.

Dimensions.—Length (of valves) 5-20ths, breadth 4-20ths. The embryonic state of some of the specimens which occur living in cork, as well as the nature of the material, induce me to consider this species indigenous. The posterior auricle is so small in comparison with that of T. megotara, that Dr. Lukis proposed the name of "microtara" for this species. Specimens in cork are frequently encysted.—*Jeffreys.*

b. *External surface of the valves ornamented by a narrow radiating area with crowded sculptured lines.*

* *Pallets.*

Blade spatulate, truncate at the end. Concave on one side, convex on the other. Tube concamerated.	Norvagica.
Blade spatulate, truncate at the end. Concave on one side, convex on the other Tube?	Senegalensis.
Blade spatulate, truncate at the end. Concave on one side, blade very short. Tube concamerated,	divaricata.
Blade spatulate, but the sides incurved in the middle, end margin concave. Tube not concamerated,	navalis.
Somewhat hastate, but truncate and heart-shaped at the end. Tube not concamerated	megotara nana.
Angularly ovate, dilating into a broad blade, abruptly truncate. Tube not concamerated	dilatata
Transverse, end margin sinuous, stalk deflected at an angle from the plane of the blade. Tube not concamerated	malleolus.
Palæform, dilated, profoundly emarginate at the end. Tube?	elongata.
Obliquely truncate, tridentate and serrate at the end. Tube?	truncata.
Narrow, long, colored, stalk white. Tube not concamerated	pedicellata.

* * *Valves.*

Posterior auricle broad, towering above the beaks, its basal edge situated lower than that of the anterior area	megotara nama.
Posterior auricle broad, not extending above the beaks, its basal edge situated lower than that of the anterior area	navalis pedicellata dilatata.
Posterior auricle broad, not extending above the beaks, its basal edge even with that of the anterior area	Norvagica.
Posterior auricle narrow, apex extending above the beaks, the lower edge even with that of the anterior area	malleolus.
Posterior auricle narrow, apex not extending above the beaks, the lower edge even with that of the anterior area	divaricata.

The above table of distinctive characters must be used with extreme caution, as individuals of the various species sometimes occur which do not well accord with their characters as given therein.

Several East Indian species are but partially included, because the descriptions are not sufficiently accurate for the arrangement of their valves.

T. elongata, Quatrefages.

T. elongata, Quatrefages, Ann. Sc. Nat. 3d ser. xi. p. 33. Adams, Genera, ii. p. 333. Fischer, Journ. de Conchyl. 2d ser. i. p. 133. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 126.

T. Senegalensis, Fischer, Mel. Conchyl. p. 19, t. 4, f. 2—6.

T. Petitii, Recluz, Rev. et Mag. Zool. 2 ser. i. p. 64.

Hab.—Indian Ocean.—*Eydoux and Souleyet.*

East coast of Africa.—*Webbe.*

Description.—"Coquille assez solide, allongée, à angle antérieur très ouvert (95°—100°); oreillette anterieure courte; postérieure étroite, allongée, non relevée; sommet tronqué avec une légère crête horizontale dépassant la callosité de la charnière et située au-dessus; apophyse styloïde mince; palettes obliquement tronquées, bicuspides; tube fragile."—*Fischer.*

Recluz thus describes *T. Petitii.*

"T. palmulis duabus rectis, palæformibus; latere dilatato, profundè emarginato; dentus obtusiusculis; tubo brevi, cylindrico-conico, vix arcuato; posticè supernè ac infernè emarginato, lateraliter angulis binis producto.

"Hab. trouvé par W. Webbe dans un morceau de palmier venant du haut de la rivière de Grand-Bassam (côte ouest d'Afrique), et envoyé à M. Petit de la Saussaie, qui a bien voulu nous permettre de le décrire.

"Coquille subglobuleuse, échancrée à la partie antéro-inférieure d'un peu plus du quart de son volume. Les valves sont plus hautes que tongues, courbées en arc, auriculées supérieurement à leur côte antérieur et brusquement atténuées en pointe à l'inférieur; convexes en dehors, concaves en dedans et auriculées, en avant et en arrière. Auricules antèrieures anguleuses, profondément striées longitudinalement (transversalement Lk.), avec les lignes élevées, croisées en arrière. Auricules posterieures ascendantes à la marge et subtronquées. Le centre des valves divisé en deux parties par un large sillon vertical orné de stries arquées; la partie antèriure sculptée d'avant en arrière par des lignes regulières saillantes et granuleuses; la postérieure par d'autres lignes moins en relief, obliquant d'arrière en avant, courbées au sommet et à la base, où elles se continuent evec celles du sillon. Auricules postérieures ascendantes à la marge et tronquées. Appendice de l'intérieure des valves arqué, aplati, étroit et prolongé jusqu' aux deux tiers de leur face intérieure.

"Tube cornico-cylindrique, un peu arqué, recouvert d'un épiderme, brun, rugueux, très-ouvert et à bords minces en avant, solide en arrière, échancré en dessus plus fortement qu'en dessous, à côtés prolongés en pointe obtuse et renforcès en dedans par un angle aigu correspondant aux échancrures des palettes. Longueur 26 millim.; largeur: en avant 6 millim. $\frac{1}{3}$; en arrière 2 millim $\frac{1}{2}$."

T. dilatata, Stimpson.

T. dilatata, Stimpson, Bost. Proc. iv. 1851, p. 113. Stimpson, Check List, No. 250. Stimpson, Shells of New England, p. 26. Adams, Genera ii. p. 333. Kurtz, Cat. p. 3. Tufts, Proc. Essex Inst. i. p. 26.

Hab.—United States from the coast of Massachusetts to South Carolina.

Coll. Acad. Nat. Sciences.

Description.—"Valves white, polished; length and breadth equal; anterior area with fine, concentric, somewhat divergent striæ, varying in number in different specimens, and more crowded below; the slightly oblique lines on the succeeding narrow area are very minute but sharp; the next, fang-shaped area is ornamented with distant, narrow, elevated, subimbricated, concentric lines, more conspicuous on the anterior than on the posterior half of the area; the remaining portion of the body and the auricle are smooth and glossy. The auricle is not separated from the body by any sharp angle on the posterior ventral outline, but by a gently waved sinus. A depressed line runs from the beak around to the tip of the auricle, which does not tower above the callosities of the hinge. The subumbonal blade is thin, tapering, and extends to about half the distance from the beak to the ventral edge.

"The pallets are of an angular ovate form, truncated posteriorly, where also, on the external surface there is a small depressed area. The style of insertion is sharp, and extends in the form of a ridge for some distance on both sides after its juncture with the pallet. The tubes are very thin, strongly concamerated posteriorly in an imbricated manner. This species differs from T. megotara, Hanley, which it greatly resembles, in the smaller altitude of the valves, the greater breadth of the auricle, which is also placed much lower, and in its concamerated tubes.

"Length of valves nearly one-half of an inch.

"For many living specimens of this species, I am indebted to Mr. S. Tufts, of Lynn (Mass.), who obtained them from a pine buoy used to indicate the position of the lobster pots of fishermen. Thus there can be no doubt of their being indigenous. They commit yearly great ravages upon the shipping of Lynn and Marblehead."—*Stimpson's description.*

T. divaricata, Deshayes.

T. divaricata, Deshayes, MSS. Fischer, Journ. Conchyl., 2d ser. i. p. 137, t. 7, f. 7, 8, 9.

T. Norvagica, var. divaricata, Jeffreys, Ann. & Mag. Nat. Hist. 3d ser. vi. p. 121.

Habitat.—Sicily.

Description.—Shell globular, convex, heavy, full as wide as its length. Anterior auricle very large and long, being two-thirds the length of the fang; its anterior margin thick, appearing almost ribbed, somewhat concave but nearly straight, inclining outwards; basal margin very convex, joining the fang by an acute angle. The fang is but slightly raised above the anterior area and is itself somewhat lower, or nearly on a level with the margin of the posterior auricle; the whole dorsal edge of the shell is slightly convex. Lateral margins of the fang inclining obliquely, with the ventral termination truncate. Posterior auricle very small, (almost none,) much longer than wide, but its basal margin does not extend nearly so far down as that of the anterior area. The latter is covered with concentric striæ, which, at its junction with the body, are recurved obliquely downwards and posteriorward. The space between the centre and posterior lateral margin of the fang, appears to be occupied by the same double, narrow, closely striated radiating area, that is found on the *anterior* side in T. megotara, &c. Posterior auricle somewhat striated. Internal dorsal margin very wide and massive. Apophysis wide, recurved backwards in front.

Pallets truncate, resembling those of T. Norvagica, their blades very short.

Mr. Jeffreys considers this a variety of T. Norvagica, but, if Fischer's figures can be depended on, it is certainly very distinct from that species. It may be proper to add, that my description is made up from that of Fischer, and his illustrations.

T. malleolus, Turton.

T. malleolus, Turton, Conch. Dithyra, p. 255, t. 2. f. 19. Adams, Genera, ii. p. 333. Brown, Conch. Gt. Brit. p. 116, t. 50, f. 16. Fleming, Brit. Anim. p. 454. Gray, Phil. Mag. 1827, p. 410. Gray, Ann. & Mag. Nat. Hist. 2 ser. viii. p. 386. Hanley, Desc. Cat. p. 4, t. 11, f. 23. Hanley, Brit. Moll. i. p. 84, t. 1, f. 12—14. Jeffreys, Ann. & Mag. Nat. Hist. 3d ser. vi. p. 123. Sowerby, Ill. Brit. Shells, t. 1, f. 5. Thompson, Fauna of Ireland, Ann. & Mag. Nat. Hist. xx. p. 174. Thorpe, Brit. Mar. Conch. p. 28.

Hab.—England, Ireland, (*introduced.*) Native habitat Sumatra.

Description.—Valve, with the body very convex, narrow, much longer than

broad, the anterior area moderate, the posterior narrow and extending above the beaks.

Anterior auricle with its dorsal margin declining concavely from the beak to a lateral angle, whence its basal margin extends rather convexly and obliquely downwards to its junction at an angle with the body, the point of junction being horizontal with, or slightly below that of the posterior auricle, and at about two-fifths the length of the shell from its apex.

The lateral margins of the fang are, anteriorly very slightly concave, posteriorly convex, and the ventral termination is infolded, forming a strong internal tubercle.

Posterior auricle quite narrow, being about three times as long as its width, reaching in typical specimens slightly above the beaks; its posterior margin is very oblique and curved, following the direction of the fang. Beaks elevated, not wide.

Internally, the shell is quite concave, with the auricles but little reflected, the posterior one marked by a shell-like ridge extending over the body. Apophysis oblique, slanting posteriorly, strongly clavate at its termination. Dorsal margin somewhat lamellar, becoming prominently elevated at the beaks, where it is crowned by a tubercle.

Color white, glossy; the anterior area elegantly concentrically sculptured, the anterior side of the body ornamented with the usual narrow radiating and decussately striated area, posterior to which the surface gradually becomes smooth.

The tube is semi-concamerated, and very fragile.

The pallets are widely different from those of any other species, the blade being very transverse, much broader than long and widest at the apex, which is a horizontal sinuous line: both lateral margins are generally angularly convex, rapidly diminishing to the short compressed stalk. The stalk, instead of continuing in the same plane as the broad side of the blade, is deflected from it at an obtuse angle.

T. megotara, Hanley.

T. megotara, Hanley, Brit. Conch. i. p. 77, t. 1, f. 6, and t. 18, f. 1, 2. Jeffreys, Ann. & Mag. Nat. Hist. 3d ser. vi. p. 121. Sowerby, Illust. Brit. Shells, t. 1, f. 3.

nana, (part.) Fischer, Journ. Conchyl. 2 ser. i. p. 136. Gray Ann. & Mag. Nat. Hist. 2 ser. viii. p. 386.

oceani, Sellius, Hist. Nat. Tered.

Bruma dell'oceano, Vallisnieri, Op. Phys. Med.

Hab.—England.

Coll. Acad. Nat. Sciences.

Description.—Valves about as wide across the auricles as their length, the body rapidly attenuated to the base. The anterior auricle is moderate and subtriangular; the posterior is dilated, very large, and rising above the beak, while its basal margin extends *below* the line of that of the anterior area.

The anterior area nearly approximates in form to that of T. Norvagica and joins the body below, at right angles. The posterior auricle exhibits a marked difference from that of the last-named species; its dorsal margin is so very concave in form as ordinarily to exhibit an approach to three-fourths of a circle, the highest posterior point of which is curved forwards somewhat, so that the dorsal apex of the auricle points anteriorly and extends above the beak. From this highest point the margin posteriorward is obliquely declining and moderately convex in outline to the extreme posterior extension, (which is considerably below the middle of the auricle) whence it sweeps around very convexly, joining the fang or body considerably below the middle of the valve, and below the line of the base of the anterior area, by a somewhat rounded angle. The anterior lateral margin of the body is directed posteriorly, and is

slightly flexuous or nearly straight; the posterior lateral margin is more convex, and eventually sweeps rapidly to the anterior side, its junction with which forms an acute or narrow ventral termination. The beaks are very narrow, tuberculated, and elevated.

The surface externally and internally, like the other species, is ivory white and somewhat polished. The anterior area is concentrically sculptured, becoming more crowded towards its base; it is separated by a slightly impressed line from the body. The body is ornamented by a radiating narrow area, increasing towards the base, both sides defined by a furrow. This area is subdivided into two, and is closely transversely striated, and marked less frequently by minute raised ridges, directed obliquely downwards to the centre from each outer margin. The surface of the fang and auricle posterior to the radiating area, is smooth or sparingly striate. The auricle is not separated from the body by any marked line, but its commencement is marked by the transition from a convex to a concave surface, caused by the great outward reflexion of the auricle.

Internally, the beak is small but prominent, bearing a narrow oblique rib on its surface, and turned posteriorly. The apophysis hugs rather closely to the body, and is thin, blade-shaped and acuminated to the end. The ventral tubercle is well formed and conspicuous but does not exhibit much evidence of arising from an internal rib. The auricle is not internally defined, save by the greater thinness and translucency of its substance.

The pallets are small, the blades are somewhat heart-shaped at the apex, rounded and curved outwards to an extreme point near their base on either side. These points are not opposite, but one is situated higher on the blade than the other; from these the margins concavely contract into the stalks, which become narrower towards their termination, ending in a point.

Tube solid, not concamerated, twelve to eighteen inches long. Diameter of valves about half an inch. Mr. Hanley described this species in the British Mollusca, supposing it to be identical with Turton's T. n a n a, whose name and description he suppressed on the ground that they were founded on young and imperfect shells. It has since been ascertained that this species is distinct from T. nana.

Messrs. Fischer and Jeffreys both consider T. d i l a t a t a of Stimpson, a synonym of this species, but the concamerated tube and differently formed pallets are prominent distinctive characters.

The blade of the pallet in d i l a t a t a dilates convexly from a very fragile stalk into a broadly oval form, truncate at the end, while in T. m e g o t a r a the dilation is *concave* to a point on each side, from which the margins are narrowed and rounded to a bilobed truncated end. The pallets of d i l a t a t a are more nearly allied to those of N o r v a g i c a than to m e g o t a r a.

T. n a n a, Turton.

T. n a n a, Turton, Conch. Dithyra, p. 16, t. 2, f. 67. Adams, Genera, ii. p. 333. Brown Conch. Gt. Brit. p. 116, t. 50, f. 14, 15. Catlow, Conch. Nomenc. p. 3. Fleming, Brit. Anim. p. 455. Gray, Phil. Mag. 1827, p. 410. Hanley, Desc. Cat. p. 4, t. 11, f. 22. Jeffreys, Ann. & Mag. Nat. Hist. 3d ser. vi. p. 122. Thorpe, Brit. Mar. Conch. p. 29.

T. n a n a, (*part.*) Fischer, Journ, Conchyl. 2d ser. i. p. 136. Gray, Ann. & Mag. Nat. Hist. 2d ser. viii. p. 386.

T. navalis, Möller, Moll. Grœn.

T. denticulata, Gray, Ann. & Mag. Nat. Hist. 2d ser. viii. p. 386. Adams, Genera, ii. p. 333. Fischer, Journ. Conchyl. 2d ser. i. p. 135.

Pholas Teredo, Müller, Prodr. Tool. Dan, p. 251. Fabricus, Faun. Groen. p. 427.

Hab.—England. "Floating wood. Occurs with T. m e g o t a r a and s u b e r i c o l a, but by no means so numerous as either of them." *Jeffreys*, Northern Ocean. Greenland.

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Description.—Having no good figure of T. n a n a, nor specimens to refer to, I can only give the distinctive characters from T. m e g o t a r a as pointed out by Mr. Jeffreys, and also Fischer's description of *T. denticulata*.

"Coquille subsphérique, mince, très-ouverte antérieurement et postérieurment, inégalement divisée en deux portions par un zonule submédiane; bord antérieur étroit, formant un angle droit profond, oreillette antérieure aigué postérieure lisse, plus large, réfléchie. Palettes ovalves, allongées, minces; pédicule grèle, court, aigu."—*Fischer.*

"It differs from m e g o t a r a in the valves being more compressed and solid, in the anterior auricle being much smaller, and having a more obtuse angle and fewer striæ, in the posterior auricle being larger and higher, and especially in the very strong and prominent tubercle or false tooth. The tube of T. n a n a appears to be destitute of calcareous lining, except towards the entrances, while T. megotara forms a solid tunnel; and the lunule of the pallets is more incised in T. n a n a. Adult specimens measure 21 inches in length. The Turtonian types decidedly belong to this species and not to m e g o t a r a."—*Jeffreys.*

Turton's miserable description from imperfect and immature specimens, is—

"Shell with the valves rounded, and *without auricles behind*, a strong conic tooth on the margin above the teeth."

T. n a v a l i s, Linn.

T. n a v a l i s, Linnæus, Syst. Nat. ed. 10, p. 651; ed. 12, p. 1267. Adams, Genera, ii. p. 333. Blainville, Dict. Sc. Nat. lii. p. 267. Bosc, Conch. ii. p. 202, t. 5, f. 4–7. Catlow, Conch. Nomenc. p. 3. Chenu, Encyc. Hist. Nat. Moll. p. 233, f. 245–7. Cuvier, Regne Anim. i. ed.; ii. p. 494. id. ed. 2, iii. p. 160; id. ed. Griffith, xii. t. 8, f. 2; id. ed. Audouin. t. 114, f. 2. Delle Chiaje, Mem. iv. p. 23, 32, t. 54, f. 2, 8. Deshayes. Traité Elem. i. pt. 2, p. 59, t. 3, f. 1–9. D'Orbigny, Moll.; Sagra's Cuba, p. 211. Eichwald, Fauna Caspio Caucasica, p. 23. Ferrussac, Encyc, Meth. p. 1003. Fischer, Journ. Conch. 2d ser. i. p. 134. Forbes & Hanley, Brit. Moll. i. p. 74, t. 1, f. 7, 8, t. 18. f. 3, 4. Georgi. Beschreib des Russ. Reichs. iii. p. 2216. Gerville, Cat. Coq. Manche. p. 55, Gmelin, Syst. Nat. p. 3747. Gould, Invert. Mass. p. 26. Guerin, Iconog. du Reg. Anim. Moll. t. 33, f. 2. Hanley, Shells of Linn. p. 450. Heinrich, Medicinische Zeitung Russlands, 1845, p. 372. Jay, Desc. Cat. 4th edit. p. 9. Karsten, Mus. Leskeanum, t. 1, p. 308. Lamarck, Anim. sans. Vert. v. p. 440. Middendorff, Mal. Rossica, iii. p. 79. Pallas, Reise. Siid. Russ. p. 418. Pallas, Tabl. Phys. de la Tauride, p. 40. Payraudeau, Cog. du Corse, p. 26. Pennant Brit. Zool. 1 ed. iv. p. 147. Philippi, Moll. Sicil. i. p. 2; ii. p. 3. Poli, Test. Utr. Sicil. pt. 2, t. 57, f. 45, 46. Potiez et Michaud, Gallerie des Moll. ii. p. 273. Scacchi, Cat. Coq. Reg. Neap. p. 8. Sowerby, Ill. Brit. Shells, t. 1, f. 1. Wheatley, Cat. No. 30.

T. marina, Sellius, Hist. Nat. Tered. t. 2, f. 2, 3, 6. Jeffreys, Ann. & Mag. Nat. Hist. 3d ser. vi. p. 124.

T. Batava, Spengler, Skrivt. Nat. ii. pt. 1, p. 103, t. 2, f. C. Gray, Ann. & Mag. Nat. Hist. 2d ser. viii. p. 386.

T. vulgaris, Lamarck, Syst. des Anim. s. Vert. 1801, p. 128.

Dentalium navis, Linnæus, Faun. Suec. No. 1329. p. 380. Belkmeer, Naturkundige. Zee, Worm. t. 2, f. 7, 8, 9. Frisch, Mus. Hoffmannianum, t. 1, t. 2, f. 9, t. 3, f. 19, 20, t. 4, f. 2, 5, 6. Massuet, Recherches sur les Vers. t. 1, f. 1, 2. Monath, Dissert. sur le Taret de Hollande, t. 1, t. 2, f. 9, t. 3, f. 19, 20, t. 4, f. 2, 5, 6. Rousset, p. 15, 16, 17, f. 1, 2, 3, 4, 10. Vallisnieri, Nat. ii. t. 4.

Hab.—England; Holland; Senegal; United States; North Sea; Mediterranean Sea.

Coll. Acad. Nat. Sc. Helgate, New York, from a British frigate sunk during the revolutionary war.

Description. Valves about equal in length and breadth, much resembling in general form those of T. N o r v a g i c a, but with the posterior auricle expanded somewhat laterally, and its base extending lower than that of the anterior area. The anterior area moderate, not generally so large in proportion to the valve as that of N o r v a g i c a, and having a more convex basal margin; it inclines somewhat obliquely downwards to the fang, its junction being considerably higher up than that of the posterior auricle. Anterior lateral margin of the fang nearly straight; posterior lateral margin much shorter than the other, on account of the lower extension of its auricle, very oblique. Fang acuminating rapidly towards the base. Posterior auricle not ascending, but produced laterally, its dorsal edge mostly somewhat concave, lateral margin nearly straight, a little oblique, rounded at each end. Basal margin slightly declining towards the fang, shorter than the dorsal edge on account of the expansion of the fang laterally.

The internal ventral tubercle and the dorsal rim do not differ from those of T. N o r v a g i c a. The apophysis is broad but thin, not thickened at the end, and the same breadth throughout; it is twisted so that one sharp edge, instead of the flat of the blade, is turned towards the interior surface of the fang. The posterior auricle is defined by a close, projecting rim.

Externally, the anterior area is closely striated concentrically, and its posterior limit is defined by an impressed line; succeeding to this is a radiating, narrow area, the closely decussated striæ of which, are sometimes quite prominent; posteriorly the surface is slightly striate concentrically, becoming smooth. The auricle is defined by a sudden depression in the level of the surface of the fang.

The pallet is convex on one side and plane on the other; the stalk, which is about as long as the blade, is moderately thick, and flexuous; it is not continued as a rib beyond the commencement of the blade, which differs from that of T. N o r v a g i c a by being more convex below, (the entire base being semi-circular) with the sides concave, and the end two-pointed, caused by a decided concavity of the centre of the margin. Tube not concamerated, long, flexuous, solid, polished, gradually narrowing.

Valves and pallets each one-fourth of an inch, and the tube eight inches in length.

This species is the T. m a r i n a of Sellius, who published, in 1733, an excellent description and figures. Unfortunately his name cannot be adopted, because pre-Linnæan, and this is the more to be regretted since the description in the Syst. Nat.* will apply to any species in the genus, and the species is only limited by the reference to the figures of Sellius.

Mr. Hanley, as one important result of his laborious examination of the types in the collection of the great Swedish naturalist, demonstrated its identity with the species of Sellius.

The *navalis* of Brit. authors prior to Forbes and Hanley, is T. N o r v a g i c a, Spengler. Many of the authorities quoted above must be admitted with doubt, —several of their descriptions are equally applicable to any species, and occasionally the figures are no more characteristic.†

It is doubtful whether the *navalis* of Sicily, Corsica and the Black Sea is

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* "T. Testa tenuissima cylindrica lævii."—*Linn.*

† The synonymy and specific description in Deshayes' Expl. Scientifique de l'Algerie, Mollusques, must be taken with great caution. The first is an indiscriminate grouping of references to all the species described by different authors, as the T. navalis of Linn., and the last is sufficiently general to cover them all!

the same as that of Linnæus; a close examination will perhaps prove them to be distinct.

T. Norvagica, Spengler.

T. Norvagica, Spengler, Skrivt. Nat. ii. pt. 1, p. 102, t. 2, f. 4—6, 1792. Fischer, Journ. Conch. 2d ser. i. p. 138. Gray, Ann. and Mag. Nat. Hist. 2d. ser. viii. p. 386. Forbes and Hanley, Brit. Mollusca, i. p. 67, t. 1, f. 1—5. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 121. Schumacher, Essai d'un Nov. Syst. p. 94.

T. Norvegica, Adams, Genera, ii. p. 333, t. 90, f. 6. a. b. c. d. Chenu, Man. Conchyl. tome 2, f. 60, 61. Jay, Catalogue, 4th edit. p. 9. Sowerby, Illust. Brit. Shells, t. 1, f. 2. Thompson, Ann. and Mag. N. H. xx. p. 157. Woodward, Manual, t. 23, f. 26–27.

T. Bruguierii, Delle Chiaje, Mem. iv. p. 28, 32, t. 54, f. 9–12. Philippi, Moll. Sicil, i. p. 2 ; and ii. p. 3.

T. Deshaii, Quatrefages, Ann. des. Sc. Nat. 3 ser. xi. p. 26.

T. fatalis, Quatrefages, Ann. des Sc. Nat. 3 ser. xi. p. 23, t. 1, f. 1.

T. nigra, Blainville, Dict. Sc. Nat. lii. p. 267.

T. Senegalensis, Laurent, Journ. Conchyl. i.

T. navalis, Brown, Conch. Brit. p. 116, t. 50, f. 1–7. Burrows, Conch. t. 22, f. 4. Crouch, Introd. Lamarck's Conch. t. 2, f. 10. DeKay, Moll. N. Y. p. 249, t. 34, f. 325, a. b. c. Donovan, Brit. Shells, v. t. 145. Encyc. Meth. t. 167, f. 1–5. Fleming, Brit. Anim. p. 454. Gould, Invert. Mass. p. 26? Gray, Phil. Mag. 1827, p. 410. Hanley Desc. Cat. p. 3. Humphrey, Conch. t. 10, f. 2, 3. Lamarck, Anim. sans. Vert. ed. 2, vi. p. 38 (not Synon's.) Maton and Rackett, Linn. Trans. viii. p. 249. Mawe, Conch. t. 35. Montagu, Test. Brit. p. 527; and Supp. p. 7. Pennant, Brit. Zool. iv. p. 147. Pultney, Dorset. Cat. p. 53, t. 18, f. 21. Reeve, Conch. Syst. t. 21. Sowerby, Genera; Sowerby, Conch. Man. f. 48. Thorpe, Brit. Mar. Conch. p. 28. Turton, Conch, Dict. p. 183. Turton, Conch. Dithyra, p. 14, t. 2, f. 1, 2, 3. Wood, Index Test. t. 38. f. 2.

T. navium, Sellius, Hist. Nat. Tered. t. 1, f. 1, 5.

T. Mediterraneus, Catlow, Conch. Nomenc. p. 3.

Septaria Mediterranea, Matheron, Ann. des Sc. du Midi, France, i. p. 77, ii. p. 312, t. 1. Deshayes, Traite Elem. i. pt. 2, p. 46, t. 2, f. 9 and 10. Cuvier, Reg. Anim. (ed. Audouin) t. 114, f. 3.

Serpula Teredo, De Costa, Brit. Shells, p. 21.

Bruma delle navi, Vallisnieri, Op. Phys. Med.

Fistulana corniformis, Lamarck, Anim. sans. Vert. v. p. 435 ; 2d edit. vi. p. 31. Blainville, Dict. des Sc. Nat. xvii. p. 85. Blainville, Man. Mal. t. 81, f. 4. Chenu, Man. de Conchyl. ii. f. 63.

Guetera corniformis, Gray, Ann. and Mag. N. Hist. 2 ser. viii. p. 386.

Uperotis corniformis, Adams, Genera, ii. p. 333.

Teredo corniformis, Catlow, Conch. Nomenc. p. 3. Deshays, *Note* in Lam. Anim. sans. Vert. 2 edit. vi. p. 29 Gray, Phil. Mag. 1827, p. 410.

Teredo utriculus, Gmelin, Syst. Nat. p. 3748. Bosc, Conch. ii. p. 202. Dillwyn, Desc. Cat. p. 1089. Kammerer, Cab. Rudolst, p. 7, t. 1? Wood, Index Test. t. 38, f. 3.

Hab.—Channel Isles and Devonshire, England ; coast of France ; Senegal? United States ? Mediterranean Sea.

Coll. Acad. Nat. Sciences.

Description.—Valves of moderate size and solidity, longer than broad. The anterior auricle subtriangular, about equalling the posterior in size, and the basal margins of the two being nearly on a horizontal line. The body or fang-shaped portion is rather more than double the length of the auricles, and is about half as wide as its length. The posterior auricle is not elevated nor ex-

panded, its outline is semi-orbicular, flattened somewhat on the upper margin, but quite convex laterally, and moderately so basally, where its junction with the body is not angulated or but slightly so.

The dorsal edge of the anterior area descends concavely to an acute point, whence the basal edge, sweeping in a quarter circle and thence continuing horizontally, is brought to join the body or fang almost at right angles. The anterior side of the body from this junction is almost straight to the base, its direction being slightly inclined to the posterior side of the valve. The posterior lateral edge of the body from its junction with the auricle is continued towards the base, first slightly, but at length becoming decidedly convex in outline, until its somewhat angular junction by a rounded basal margin, with the anterior side. The surface of the body towards the beaks becomes convex and elevated, sloping off towards each side and also towards its dorsal margin, which is mostly higher than either auricle, and convex in outline. The dorsal edge of the posterior auricle is generally somewhat concave in outline, descending slightly from the beaks in typical specimens, although occasionally it is parallel with or even rising slightly above them; its posterior lateral termination is marked by a slight reflexion upwards, from which the marginal outline of the lateral and basal sides, as before stated, is convex to its junction with the body.

Viewed internally, the whole dorsal margin of the valve is marked by a raised or thickened border; the beaks are rather large and overhanging, culminating in an irregular tubercle in the centre, from beneath which springs a rather broad curved blade, which terminates in a rapidly enlarging, rounded or irregular clavate end. The inner surface of the fang or body is also marked by an elevated rib, which, not particularly prominent at first, becomes more distinct as it approaches the base, and is there arrested and turned upon itself apparently by the infolding of the exterior surface, forming a rounded tubercle. The division of the posterior auricle from the fang is internally defined by an oblique curved carina, the lower edge of which, near the beaks, slightly projects over the inner disc, but it does not, as in some of the other species, form a continuous ledge from the beaks to the margin. The internal surface of the fang is hollowed in the centre, rising towards either auricle, which becomes convex in the middle and laterally reflected outwards. The surface is pure white and polished.

The external markings of the valve are very beautiful,—the anterior area is ornamented by about sixty close and sharp concentric striæ diverging from the dorsal margin. A narrow radiating area enlarging from the beaks towards the base, occupies the anterior portion of the body and is closely covered with a series of beautiful minute grooves, which define the boundary-line of the anterior area by their junction almost at right angles with its striæ, these fine grooves, when viewed with a microscope, are found to be decussated by still finer lines. Posteriorly, to this area, the grooves diverge into rather distant slight concentric arches gradually vanishing towards the posterior auricle, the commencement of which is defined by a line, occasionally obsolete. The auricle is generally smooth, but occasionally with confluent raised granules or points. The whole surface is white and polished when devoid, as it usually is, of its thin olivaceous epidermis.

The pallets are somewhat spoon-shaped in outline with a truncate apex. One side is convex and plain, whilst the other is concave, with a raised mid-rib, which, becoming more prominent towards the base, merges into the stalk, which is slender, cylindrical, or flexuous, and about as long as the blade.

The tube is not much contorted, but generally slightly flexuous, narrow, tapering, polished externally, solid in texture and rather easily detached from its burrow. It is semi-concamerated at its lower end, divided by ten or twelve crowded, thin, orbicular partitions, which, however, leave a large oval orifice in the centre.

Dimensions.—Length of valves half an inch; breadth somewhat less. Length of tube about one foot; but individuals have occurred in which the tube is two and one-half feet long and the valves three-fourths of an inch.

Mr. Jeffreys considers the T. corniformis of Lamarck to be the tube of this species, which is very probable, and I have therefore placed that species among the synonyms of *Norvagica.*

The present shell is the T. navalis of all British authors prior to Forbes and Hanley's Mollusca, the confusion of the species originating in the miserable description of the Syst. Naturæ, which will apply equally well to any species of the genus, and continued, probably, from the difficulty of procuring extensive suites of specimens, and from the uninviting nature of their study.

The figures of DeKay are copied from Turton, and therefore represent this shell and not the true T. navalis.

The illustrations in Donovan and Pultney will suit equally well for this or either of the other British Teredæ.

T. nigra, Blainville, is considered by Messrs. Fischer and Jeffreys to be a synonym of Norvagica, and not having seen specimens, I have followed them in including it here, but as it appears to me that the original description does not exactly suit Norvagica, I reproduce it here.

"Coquille assez grande, de quatre à cinq lignes de haut sur autant de long, épaisse, solide, entierement couverte d'un epiderme noir; côté postérieur ou tranchant fortement anguleux et striaé au moins de soixant stries tres-serrées, surtout sur la partie verticale; pallets ovales, alongées, *non-tronquées.*

Cette grande espèce de taret, dont je possède un individu envoyé par Mlle. Warn à M. DeFrance, à été trouvée sur les côtes d'Angleterre, dans la carcasse d'un navire venant de l'Inde et échoué depuis long-temps à quelque distance, du rivage. Elle est parfaitèment distinct par sa taille, sa couleur, et par le nombre considerable de ses stries.

T. pedicellata, Quatrefages.

T. pedicellatus, Quatrefages, Ann. des Sc. Phys. 3d ser. xi. p. 26, t. 1, f. 2. Adams, Genera, ii. p. 333.

T. pedicellata, Fischer, Journ. Conchyl. 2d ser. i. p. 139. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 123.

Hab.—Islands in the British chaunel and Northern Coast of Spain and Algiers.

Description.—"Coquille subsphérique à peu près aussi longue que large; angle antérieur presque droit (90°), tombant fort en arriére. Stries très-fines et trés nombreuses. Palmules étroites, allongées, portées à l'extrémité d'une sorte de manche d'apparence cartilagineuse. Le pédicule est toujours blanc, tandisque les palettes sént colorées en bron foncé. Taille inférieure de moitié environ à celle du Ter. Norvagica."—*Fischer.*

"Although the valves in adult specimens bear a close resemblance to those of the following species, (T. marina) the pallets are unmistakably different; and in the young the striæ on the anterior auricle of the valves are much fewer, and consequently more remote than in that species. Where both species occur together, the present occupies the outer layers of the wood, while the other penetrates into its recesses. Quatrefages discovered this species at Guibuscoa, on the North coast of Spain; and I noticed it in some wood which M. Deshayes had taken on the Algerine coast. The tube is a beautiful object, being jointed in an imbricated manner, like the stalk of an *equisetum.*"—*Jeffreys.*

T. Senegalensis, Blainville.

T. Senegalensis, Blainville, Dict. des Sc. Nat. lii. p. 267. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 126. Adams, Genera, ii. p. 333,

Taret du Sénégal. Adanson, Hist. Nat. du Senegal, p. 264. t. 19. Adanson, Mem. de l'Acad. des Sc. 1759, p. 278, t. 9, f. 9, 10.

Hab.—In Mangrove roots. Coast of Senegal.

Description.—"Coquille un peu plus grosse, plus évidemment rhomboïdale, ou à quatre côtés obliquès. Le bord tranchant strié de vingt-cing stries denticulées. Pallets en spatule tronquée et non bicornée. Cette espèce, qui est indubitablement distincte du taret commun, quoiqu 'il soit assez difficile de la caractèrisee complétement, à cause du peu de détails dans lesquels Adanson est entré à son sujet, est fort commune dans les racines des mangliers qui bordent les fleuves Niger et de Gambie. Elle les perce verticalement, quelquefois à deux ou trois pieds; mais ordinairement à six pouces au dessus de terre."—*Blainville.*

T. truncata, Quatrefages.

T. truncata, Quatrefages, Ann. des Sc. Nat., 3d ser., xi. p. 27. Adams, Genera, ii. p. 333. Fischer, Journ. Conch., 2d ser., i. p. 133. Jeffreys, Ann. and Mag. Nat. Hist., 3d ser., vi. p. 126.

Hab.—Amboina, Quoy et Gaimard.

Description.—"Coquille fragile, presque sphérique, fortement échancrée et anguleuse à son bord antérieur; l'angle antérieur est de 90° environ, son sommet se trouve placé assez en arrière, et ses bords paraissent plus rectilignes que dans la plupart des autres espèces. Stries de l'oreillette antérieure assez irrégulières, si ce n'est vers les bords; palettes pédiculées, tricuspides, obliquement taillées en biseau de dehors en dedans."—*Fischer.*

Quatrefages' Description is . . . . . "testâ fragili, quasi sphæricâ, alte emarginatâ; emarginatione 90 gradibus hiante; palmulis pedicellatis, in obliquum truncatus, tridenticulatis."

Subgenus Calobates, Gould.

Calobates, Gould, Proc. Bost. Soc. Nat. Hist., viii. p. 280, Feb., 1862. Gould, Otia Conchologica, p. 241, 1862.

Description.—"Pallets stilt-shaped, bony. Type *T. thoracites*, Gould."

I owe to the kindness of the author, an opportunity to examine specimens of the valves of this interesting shell, and also a sketch of the pallets. The latter are indeed very remarkable, and indicate very clearly a subgeneric, if not generic distinction, from Teredo. A more particular description of them is contained in that of the species.

T. thoracites, Gould.

T. thoracites, Gould, Bost. Proc., vi. p. 15. Gould, Otia Conchologica. p. 222, 241.

Hab.—Burmah.

Description.—"Shell large, solid, length and breadth about equal; valves trifoliolate, the anterior area or leaf being very large proportionally, or about equal to the fang-like body, excepting that it is truncated anteriorly, where it is smooth, shining and callous. This anterior area is obtusely lance-pointed and sculptured with concentric striæ parallel to its basal edge, and with a few delicate cracks or rugæ radiating from the beaks; the fang-like body is large and broad, obtuse at point, and armed within by a firm rib, terminating in a rounded ivory knob; a strong flattened ridge traverses its posterior extremity, running from the junction of the posterior wing above to the point of the fang; anterior to this the fang is grooved parallel to the anterior edge; while posterior to it they take the direction of the inferior edge of the wing, and become gradually more and more recurved towards the point, and are continued on to the ridge. The posterior dorsal wing is very small and lunate, not rising above the beaks, gently arched, scarcely projecting beyond the posterior margin of the fang, its lower margin would correspond with the lower

margin of the anterior area if continued; the superior margin is rough and bony, forming a broad area defined by a sharp crested ridge, and emarginated at the junction of the wing. Hinge tubercles large, with a hook-shaped process from each, by which the valves are interlocked; the wing is formed by a sharp shell-like ridge, and is smooth and slightly excavated. The cavity of the beak is filled with a spongy calcareous matter, from which issues the delicate and flattened subumbonal process which presents its flat side to the valve, and at about one-third its length forms a decided elbow backwards.

Length from before backwards $\frac{5}{8}$ inch; from above downwards a little less.

Pallettes very large and long, stilt-shaped; the style long and subulate, slightly flexuous, bony, surrounded by a broad dilatation or step, concave on one side and convex on the other; its upper surface deeply excavated, on this is placed the blade, which is three-fourths as long as the style, thin, linear, obliquely truncated at tips, about one-third the width of the step.

Length of style 7-10ths; of blade 4-10ths inch.

Brought by Rev. F. Mason and Rev. J. Benjamin from Tavoy.

In size and solidity this exceeds all the species yet described, it is chiefly distinguished by the great size of the anterior triangular portion when compared with the posterior alar portion or auricle.

The form of the pallettes also is entirely different from any yet described; nor do I find any mention elsewhere of the spongy calcareous growth in the umbonal cavity."—*Gould.*

Genus UPEROTIS, Guettard.

Uperotis, Guettard, Memoirs, ii. p. 128. Adams, Genera, ii. p. 333.

Guetera, Gray, Syn. Brit. Mus., 1842. Gray, Zool. Proc., p. 188, 1847. Gray, Ann. and Mag. Nat. Hist., 2d ser., viii. p. 381.

Serpula, (part.) Mawe, Conch., p. 194.

Fistulana, (part.) Blainville, Dict. Sc. Nat., xvii. p. 82. Bosc. Hist. Coq., ii. p. 203. Griffith, Cuvier Regne Anim., xii. p. 124. Guerin, Iconog. Reg. Anim. Moll., t. 33. Hanley, Desc. Cat., p. 3. Lamarck, Anim. sans. Vert., v. p. 432; id. 2d edit., vi. p. 25. Potiez et Michaud, Gallerie des Moll., ii. p. 272. Schröter, Einleit, ii. Walch, Naturf., x. p. 38.

Teredo, (part.) Catlow, Conch. Nomenc., p. 2. Cuvier, Regne Anim., edit. Audouin Moll., p. 252. Deshayes, Traité Elem., pt. ii. p. 47. Deshayes, Note in 2d edit., Lamarck, Anim. sans. Vert., vi. p. 39. Dillwyn, Desc. Cat., p. 1087. Gray, Phil. Mag., 1827, p. 409. Jay, Cat., 4th edit., p. 9. Wood, Index Test., t. 38.

Dr. Gray includes in his genus *Guetera*, besides the U. clava, two other specimens, which he names:—

G. lagenuala? this = Cucurbitula cymbia, Spengler (GASTROCHÆNIDÆ).

G. corniformis, this = tube of Teredo Norvagica, Spengler.

U. clava, Gmelin, sp.

Teredo clava, Gmelin, Syst. Nat., p. 3748. Dillwyn, Desc. Cat., p. 1090. Gray, Phil. Mag., 1827, p. 410. Guettard, Mèm., iii. t. 7, f. 6—9. Wood, Index Test., t. 38, f. 4.

Guetera clava, Gray, Ann. Mag. Nat. Hist., 2d ser., viii. p. 386.

U. clava, Adams, Genera, ii. p. 333.

Fistulana gregata, Lamarck, Anim. sans. Vert., v. p. 435; ditto, 2d edit., vi. p. 31. Bosc, Hist. Coq., ii. p. 204. Encyc. Meth., t. 167, f. 6—14. Griffith, Cuv. Reg. Anim., xii. t. 8, f. 3. Guerin, Iconog. Reg. Anim. Moll., t. 33, f. 3. Hanley, Desc. Cat., p. 3. Potiez et Michaud, Gallerie des Moll., ii. p. 272. Schröter, Einleit., ii. p. 574, t. 6, f. 20. Walch, Naturforsch., x. p. 38, t. 1, f. 9, 10.

Teredo gregata, Deshayes, Note in 2d edit. Lam. Ann. sans. Vert., vi. p. 39.
Fistulana gregaria, Blainville, Dict. Sc. Nat., p. 83.
Serpula retorta, Mawe, Conch., t. 34, f. 5.
Teredo nucivorus, Spengler, Skrivt. Nat., ii. pt. 1, p. 105, t. 2, f. d. Catlow, Conch. Nomenc., p. 3. Cuvier, Regne Anim., ed. Audouin, t. 114, f. 4. Deshayes, Traité Elem., t. 2, f. 15—18. Dillwyn, Disc. Cat., p. 1090. Jay, Catalogue, 4th edit., p. 9.
Hab.—Tranquebar, Pondichery, etc.*
Coll. Acad. Nat. Sciences.

Description.—Valves covered by a brown epidermis, solid in texture, very convex, narrow, being two and one-half times longer than their width; in this respect differing very much from the other species of the family. Anterior auricle extending about one-third the total length, with its basal margin very oblique and long, and its dorsal margin short and declining; lateral anterior side sharply angulated by the junction of the dorsal and basal margins. Posterior auricle very small, consisting of a mere triangular lateral swelling of the margin, appearing in some specimens like a tooth. Beaks very narrow, much raised, and tuberculate.

Internally the fang is deeply and narrowly channelled from the beaks to the ventral tubercle. Apophysis very oblique, curved, turning to the posterior side. Anterior to the central channel the substance of the valve is much thinner.

Externally the anterior area is marked by a few rather coarse concentric striæ. Anterior to the centre of the fang and opposed to the internal channel is a corresponding longitudinal raised rib, which is rather closely transversely striated; posterior to the rib the surface is nearly smooth, with the exception of a few longitudinal striæ, visible on the posterior shoulder.

Length $\frac{1}{3}$ inch; breadth not quite $\frac{1}{6}$th inch.

Pallets about $\frac{1}{3}$ inch in length, the blade exceeding the style; blade spoon-shaped, concave on one side, convex on the other, and thickened on the convex side to a little above the middle, whence it is depressed to the tip; the depressed area is covered with elegant ribs which radiate to all parts of the upper margin, causing it to be toothed.

Tubes singularly contorted and twisted upon themselves, a mass of them frequently growing together, they are of a light brown or yellowish red color, and very solid, rapidly acuminating from the rounded base to the upper end.

Length four inches; breadth at base three-fourths of an inch, at tip half as much.

Genus XYLOTRYA, Leach.

Xylotrya, Leach, MSS. (subgenus.) Adams, Genera, ii. p. 333. Gray, Zool. Proc. p. 188, 1847. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 381. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 125. Menke, Syn. Meth., 1830. Sowerby, Illust. Brit. Shells.
Xylotrya, Quatrefages, Ann. des Sc. Nat. 3d ser. xi. p. 28.
Bankia, Gray.
Teredo, (part.) Blainville, Dict. Sc. Nat. lii. p. 259. Blainville, Malacol. p. 579. Bosc, Hist. Coq. ii. p. 197. Catlow, Conch. Nomenc. p. 2. Chenu, Man. ii. p. 12. Cuvier, Regne Anim. edit. Griffith, xii. p. 123. Delle Chiaje, Mem. iv. Deshayes, Encyc. Meth. p. 1002. Fischer, Journ. Conchyl. 2d ser. i. Forbes and Hanley, Brit. Moll. i. p. 58. Hanley, Desc. Cat. p. 3. Home, Phil. Trans., 1806. Lamarck, Anim. Sans. Vert. edit. 1, v. p. 438; et edit. 2, vi. p. 35. Lamarck, Syst., 1801. Philippi, Enum. Moll. Sicil. i. p. 2, et ii. p. 3. Spengler, Skrivt. Nat. ii. pt. 1. Schumacher, Essai d'un Nov. Syst. Thompson, Ann. and Mag. Nat. Hist., 1847. Turton, Conch. dithyra, p. 13.

* The specimen in Coll. A. N. S. is marked "St. Croix, W. I.," doubtless a mistake.

X. BIPENNATA, Turton.

X. BIPENNATA, Turton, Conch. Dict. p. 184, f. 38—40. Turton, Conch. dith. Brit. p. 15. Brown, Conch. Gt. Brit. p. 116. Catlow, Conch. Nomenc. p. 2. Fischer, Journ. Conchyl. 2d ser. i. p. 257. Fleming, Brit. Anim. p. 454. Gray, Phil. Mag., 1827, p. 411. Hanley, Desc. Cat. p. 4, t. 9, f. 50. Hanley, Brit. Mollusca, i. p. 80, t. 1, f. 9—11. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 126. Quatrefages, Ann. des Sc. Nat. 3d ser. xi. p. 30. Thorpe, Brit. Mar. Conch. p. 28.

X. *pennatifera*, (part.) Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 386.

X. *carinata*, Leach, Adams, Genera, ii. p. 333.

T. carinata, Leach, Blainville, Dict. Sc. Nat. lii. p. 269. Catlow, Conch. Nomenc. p. 3. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 368.

T. carinata, Blainville, Fischer, Journ. Conchyl. 2d ser. i. p. 256.

T. carinata, Gray, Phil. Mag., 1827, p. 411. Hanley, Desc. Cat. p. 4.

T. navalis, Home, Philos. Trans., 1806, p. 276. Home, Comparit. Anat. ii. t. 43.

Hab.—England (bipennata), a doubtful native. Sumatra (carinata). Coll. Acad. Nat. Sciences.

Description.—"Valves with the body or medial portion narrow and elongated. Auricle tipically projecting higher than the beaks; its upper internal edge most strongly reflected outwards; the lower internal edge scarcely sloping, and projecting shelf-fashion over the body. Triangular area extending as low down as the auricle, not large, its outer edge very oblique; tooth-like apophysis greatly slanting posteriorwards. Pallets very large, quill-shaped, of a spongy texture.

The shape of the valves is very different from that of Norvagica or Batava, the medial portion being decidedly more elongated, and the lower end of the auricle slightly more remote from the ventral tubercle than is that of the front triangle. This latter occupies less than two-fifths of an imaginary line drawn from the beaks to the base of the shell, and is concentrically traversed by raised striæ, or narrow lyræ, which are moderately close-set, and not much arcuated below, but more distant and more curved towards the commencement of the series. These are succeeded by another set of minutely decussated striæ, which occupy the narrow strip situated between the lateral triangle and the internal radiating groove, and are produced thence along the front margin of the shell. Then follows a still narrower strip, which, together with the preceding, is elevated towards the beaks above the remainder of the surface, covered with very oblique, distant, raised concentric striæ, often with finer intermediate ones, which, after passing the central, shallow, groove-like, radiating area, are more or less distinctly continued over the remainder of the surface as far as the auricle. This latter, which is smooth, small, and ear-shaped, projects at its upper part above the summit of the beak, and is internally cut off as it were from the body of the shell by its lower edge, which, almost straight and scarcely declining, projects like a ledge over the subumbonal region. Its basal line is thus almost at right angles to the hinder margin, whilst its much arcuated posterior outline runs nearly parallel to the base of the lateral triangle. This ear-shaped appendage is also most strongly reflected outwards, and is internally rather closely grooved with concentric costellæ; its hinder termination is attenuately rounded, and its front extremity is in the adult concavely, in the young subrectilinearly, more or less obliquely subtruncated.

The entire shell is white and faintly glossy; there is an extremely oblique lamina surmounted by a tooth-like process upon the hinge margin, running at acute angles to the very oblique and flat subumbonal blade, which latter is clavate, and in the most perfect specimens we have met with either tubercu-

lated or jagged at its edge near its termination. Both the posterior and anterior edges of the valves, which are inclined to solidity, are rectilinear, the front being nearly perpendicular, the hinder much more oblique; but in the young these sides are rather more parallel, and the central, or linguiform portion of the shell, much more narrow. The ventral apex is narrow, but not acute, and its internal tubercle rather broad and compressed. The pallets are very curious, and of a sponge-like look and color. They are remarkably large, in some measure resemble a quill in shape, are usually more or less curved, and have their stalk or unbarbed portion most minutely tuberculated. The upper portion, which is usually about one-half of the entire length, and even at its broadest part scarcely wider than the stalk, is closely articulated; the upper and concave edge of each joint terminating at either extremity in an ascending filament, is adorned on one side with a very fine fringe of similar but more minute filaments. The joints towards the extremity appear in the few specimens we have seen to lose their lateral filament, and the concavity of the upper edges so increases as to form a decided angle near their middle.

The tube, which we have not seen ourselves, is declared by Dr. Turton to be thicker and stronger than that of N o r v a g i c a, and simple in its outer orifice; and by Mr. Gray (1827) to be not concamerated. The diameter of the valves, from which our description was drawn up, is about four-sevenths of an inch, whilst the pallets are actually three inches in length, and about two inches broad at the widest part.

These dimensions, however, especially that of the pallet, are greatly exceeded in the Sumatran examples, from whence we may reasonably conclude that that country is in all possibility its native habitat. Specimens are extremely rare."—*Forbes & Hanley.*

Mr. Jeffreys remarks that "this species requires further investigation, because of the similarity of its valves to those of T. m a l l e o l u s, and of its pallets to those of T. p e n n a t i f e r a. The former, however, appear to present a difference in being more arched and solid than in T. m a l l e o l u s, with the anterior auricle larger and having more striæ, as well as in the posterior auricle being usually smaller; and the latter in having a shorter and much thicker stalk than in T. pennatifera, which is not annular or tracheiform as in that species, as well as in the lateral filaments being shorter and less slender."

X. c u c u l l a t a, Norman.

X. c u c u l l a t a, Norman, MSS. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 125.

Hab.—In drift fir wood at Guernsey: in teak, with T. f i m b r i a t a at Belfast.

Description.—"Tube long, thick, not easily detached from the wood, internally wrinkled near the opening. Valves roundish-oval, rather convex; body marked transversely, but regularly, with a few striæ or impressed lines; anterior auricle small, angle obtuse, striæ numerous; posterior auricle dilated and appressed, having its apex nearly on a level with the crown or umbo of the valve, inner edge free and overlapping the body; fang broad; tubercle small; apophysis sickle-shaped. Pallets composed of 20-30 calciform points or cuculli, which are broad on the outer surface, and slightly overlap one another in succession, lateral edges setaceous, with short filaments; stalks cylindrical, of same length as pallet. Dimensions: length (of valves) 8-20″; breadth 6-20″.

"The pallets resemble those of T. m i n i m a, Blainville (T. *palmulata*, Philippi) in having the front margin quite plain; but they differ in the joints being of nearly equal breadth, and (especially in the earlier stage of growth) being much more numerous and compact.

"The pallets of T. c u c u l l a t a are also three or four times as long as those of T. m i n i m a. The tube and valves of each species are easily distinguishable."—*Jeffreys.*

X. fimbriata, Jeffreys.

X. fimbriata, Jeffreys, Ann. and Mag. Nat. Hist. 3d. ser. vi. p. 126.
X. palmulata,* Forbes and Hanley, British Mollusca, i. p. 86, t. 2, f. 9–11. Stimpson, Check-List, No. 249. Sowerby, Illust. of Brit. Shells, t. 1, f. 6.
T. bipalmulata, Thompson, Ann. and Mag. Nat. Hist., 1847.

Hab.—A doubtful inhabitant of the British coast.

Description.—The shell of this species differs so little from that of T. navalis, that it is difficult to find any important distinctive characters in the valves alone. They appear, however, to be always much smaller than in navalis, and the external surface is not so highly polished; the overlapping ledge which internally marks the line of the posterior auricle is more elevated. The valves ⅓ inch in length. "The pallets, which are extremely fragile, and never attain to any considerable dimensions, closely resemble diminutive specimens of those of bipennata. They vary much with age and circumstances in regard to the number of articulations, their closeness or laxity of approach to each other, and even in their individual shapes. In the smaller specimens, (and almost all hitherto taken in our seas belong to this class, not exceeding half an inch in length,) the stem resembles a piece of fine thread, and is about equally long with the broader pennated portion which surmounts it. This latter is composed of numerous somewhat triangular pieces, of which the narrower end is jointed as it were to the broader opposite extremity of the preceding one, which is more or less deeply incurved in the middle, and has, in consequence, its lateral terminations more or less strongly forked. The basal articulation is often peculiarly graceful in shape, the lateral outline being formed by two convex lines of corresponding curve on either side. The number of these joints may average about a dozen, some apparently having only eight distinct ones, whilst others, (chiefly the larger) have nearly twice that number. The articulated portion is usually about three times as broad as the stalk, and tapers towards its termination, where the joints likewise are smaller and more closely set. In the larger pallets, where the articulations are more remote from each other, their forked extremities, instead of embracing (as in the young) the succeeding joint, project on either side beyond the narrow bases, so as to cause the lateral edges to appear serrated; in certain specimens, where the joints are peculiarly distant, and their subtrigonal forms have become in consequence less distinct, these forked terminations are produced in narrow filaments, and the central concavities are clothed with a more or less fringed membrane, which in some measure conceals the depth of incurvation. . . None of the valves we have seen at all equal the dimensions of our three first species, (Norvagica, marina, malleolus,) and the longest pallet was under two inches in length.

The tube was concamerated in Mr. Clark's examples (Exmouth) in the cabinet of Mr. Jeffrey; we confess, however, we perceived no indication of such structure in the very small perforations of the Irish specimens; in both, the testaceous matter was sparingly deposited."—*Hanley.*

X. minima, Blainville, sp.

T. minima, Blainville, Dict. des Sc. Nat. lii. p. 268. Fischer, Journ. Conchyl. 2d ser. i. p. 256. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 127.
T. bipalmulata, Delle Chiaje, Mem. iv. p. 28, t. 54, f. 18, 22, 23, 24.
T. palmulata, Philippi, Enum. Moll. Sicil. i. p. 3, ii. p. 2, t. 1, f. 8.
T. serratus, Deshayes, Mss.
T. Philippii, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 386. Fischer, Journ. Conchyl. 2d ser. i. p. 257.
X. Philippii, Adams, Genera, ii. p. 333.

* This is *not* the T. palmulata of Lamarck or Philippi.

Hab.—Mediterranean Sea.

Description.—"Coquille à peu près semblable à celle de T. navalis mais plus petite, à peu près aussi haute que large; oreillette antérieure portant plus de soixante stries; oreillette postérieure moins abaissée que chez le T. navalis.

"Palettes courtes, ressemblant à un petit épi d'orge formées de huit à dix godets courts, comprimés, imbriqués, denticulés à leur bord inférieur et le plus souvent noirâtres. Epines latérales peu developpées. Pédicule cylindrique, grêle, blanc, un peu plus long que la palette.

"*Observ.*—Cette charmant espèce n'attient jamais de grandes dimensions, mais ses ravages n'en sont pas moins redoutables; car elle abonde dans les lieux ou elle vit."—*Fischer, desc. of T. Philippii.*

Fischer separates *Philippii* from minima, and remarks that the latter is described from a young shell. Jeffreys unites the two, giving the preference to Blainville's name, as the oldest which is not pre-occupied.

X. minima is thus described in Journ. Conchyl. p. 256.

"Coquille extrémement petite, à peu près aussi haute que large; oreillette et zone antérieures plus grandes que les postérieures; stries très nombreuses, presque également, serrées et espacées sur les deux côtés de l'angle antérieur.

"Palettes portées sur un très-long pédicule et formées de douze articulations en godets, non epineuses sur les côtes."—*Fischer.*

X. palmulata, Lamarck (sp.).

Teredo palmulata, Lamarck, Anim. sans. Vert. v. p. 440; id. 2d edit. vi. p. 38. Blainville, Man. Malacol. t. 80, bis, f. 8. Catlow, Conch. Nomenc. p. 3. Chenu, Man. Conchyl. ii. f. 64, 65. Cuvier, Regne Anim. edit. Griffith, xii. t. 7, f. 5. Ferussac, Encyc. Meth. p. 1004. Fischer, Journ. Conchyl. 2d ser. i. p. 254. Hanley, Desc. Cat. p. 4, t. 11, f. 13. Quatrefages, An. des Sc. Nat. 2d ser. xi. p. 29.

X. palmulata, Adams, Genera, ii. p. 333, t. 90, f. 6e.

X. bipalmulata, Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 386.

T. bipalmulata, Lamarck, Syst. Anim. sans. Vert. p. 129. Bosc, Hist. Coq. ii. p. 202. Gray, Phil. Mag., 1827, p. 410.

Taret de Pondichéri, Adanson, Mem. Acad. des Sc., 1759, p. 278, t. 9, f. 12.

Hab.—East Indies.

Description.—The valves and tubes of this species are unknown, and but two specimens of the pallets exist in European collections; from one of these pallets (that in the Jardin des Plantes) Lamarck's description is taken,* which in fulness of detail and accuracy is scarcely inferior to the description of T. navalis, by Linnæus.

The pallets are quite large, the blade composed of twenty or more triangular joints, which are attenuated laterally into sharp projecting points. The stalks are somewhat shorter than the pallets, moderately thick, rounded, and about one-third the width of the blade. Total length about one inch.

Mr. Jeffreys remarks that they are "allied to the pallets of T. bipennata, although evidently distinct."

This species is not the T. palmulata of Forbes and Hanley, nor of Philippi.

X. pennatifera, Blainville (sp.)

Teredo pennatifera, Blainville, Dict. des Sc. Nat. lii. p. 269.

X. pennatifera, Adams, Genera, ii. p. 333. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 126.

X. pennatifera, (part.) Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 386.

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* "T. palmulis longiusculis, pinato-ciliatis, subarticulatis."—*Lam.*

X. palmulata, Leach, teste Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 386.

Hab.—England, floating wood on the coast of Guernsey (a doubtful native); and at Cherbourg, France.

Description.—"Coquille assez petite et mince, échancrée très anguleusement en avant, finement multistriée; palmules extrémement considerables, huit ou dix fois plus longues que les valves, composées d'un grand nombre d'articulations, pourvous de chaque côté d'un long cil, et postées sur un long pédicule ce qui les fait ressembler à une pennatule.

"Cette jolie espèce, qui existe . . . . . dans la collection du Museum Britannique, vient les mers de l'Inde.

"Les palmules pourroient être aisément prises, au premier aspect, pour des pennatules fort élégantes; elles different beaucoup par leur grandeur, et par leur forme de celles du taret des Indes de M. de Lamarck, (palmulata, Lam)."—*Blainville.*

X. Stutchburyi, Leach (sp.).

T. Stutchburyi, Leach, Blainville, Dict. Sc. Nat. lii. p. 268. Fischer, Journ. Conchyl. 2d ser. i. p. 255. Jeffreys, Ann. and Mag. Nat. Hist. 3d ser. vi. p. 127. Quatrefages, Ann. des Sc. Nat. 3d ser. xi. p. 28.

X. Stutchburyi, Gray, Ann. and Mag. Nat. Hist. 2d. ser. viii. p. 386. Adams, Genera, ii. p. 333.

T. campanulata, Deshayes, Mss., Brit. Mus.

T. navalis, Spengler, Skrivt. Nat. ii. p. 100, t. 2, f. 1—3. Schumacher, Essai d'un Nov. Syst. p. 94.

Hab.—Sumatra.

Description.—"Coquille sensiblement moins longue que large; valves fort minces; angle antérieur obtus (115—120°); oreillette antérieure courte, chargée de stries très-fines et très nombreuses; oreillette postérieure assez marquée, mais moins saillante que dans les Ter. palmulata et bipennata.

"Palettes assez courtes, à pédicules très courts, formées par des godets en partie cornés et demi-transparents, diminuant graduellement du pédoncule au sommet de la palette. Le bord inferieur des godets est épaissi et semble frangé, quand l'individu est fraîchement recueilli ou conservé dans l'alcool. Les godets sont legèrement comprimés, assez profonds; chacun d'eux adhère au bord inférieur de celui qui le précède par un court pedicule.

Obs.—Très-bonne espèce, bien caractérisée par des godets triangulaires, sans épines latérales. Les différentes descriptions que l'on a fait des coquilles, diffèrent par plusieurs points essentiels, et il ne serait pas étonnant qu'il y eût quelques espèces à palettes articulées semblables et à coquilles différentes, comme nous l'avons constaté chez les Tarets à palettes simples."—*Fischer.*

Subfamily 2. TEREDININÆ, Tryon.

TEREDININÆ, Tryon, Proc. Acad. Nat. Sc. p. 65, 1862.

Genus TEREDINA, Lamarck.

(*Fossil.*)

Subfamily 3. KUPHINÆ, Tryon.

Teredina, (part.), Gray, Zool. Proc. 1847, p. 188.

Teredinina, (part.), Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 386.

Genus KUPHUS, Guettard.

Cuphus, Guettard, Mem. iii. p. 139. Gray, Ann. and Mag. Nat. Hist. 2d ser. viii. p. 381.

Kuphus, Gray, Syn. Br. Mus. 1840. Adams, Genera, ii. p. 648.

Kyphus, Agassiz.

Furcella, Lamarck, Syst. p. 104, 1801, *note*. Gray, Zool. Proc. pt. 25, p. 243 and pt. 26, p. 258. Gray, Ann. and Mag. Nat. Hist. 3d ser. i. p. 295 ; and ii. p. 374. Menke, Synops. Meth. edit. 2, p. 122. Oken. Zool.

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Furcella gigantea, Gray, Zool. Proc. pt. 25, p. 243, t. 39, f. 1—3 ; id. pt. 26, p. 258 ; id. Ann. and Mag. Nat. Hist. 3d ser. p. 295 ; and ii. p. 374.

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Serpula anguina, Var. *B.* Gmelin, Syst. Nat. p. 3743.
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Hab.—Philippine Islands, Van Dieman's Land, East Indies.
Coll. Acad. Nat. Sciences.

Description.—Valves wanting. Tube contorted somewhat, gradually increasing in diameter to the base, and growing to the length of three feet. The siphonal end is divided into two internal tubes by a transverse partition. External surface roughened, by its contact during growth with surrounding objects, and exhibiting impressions of pebbles, shells, &c. Diameter at base one and a half inch inches, at siphonal end, three-quarters inch. Base rounded, "closed by two overlapping, convex septa, arising from the sides and completely closing the ends. The tube is thickened above as the animal leaves it, and is much thinner near the lower or closed extremity,"* just around which are scattered small perforations for the admission of water to the animal.

Pallets about one inch or more in length, the stalk gradually increasing into a triangular blade, the end of which is truncate on one side and two-horned on the other side.

From Proceedings of the Academy of Natural Sciences of Philadelphia, September, 1862.

Description of a new Genus and Species of PHOLADIDÆ.

BY GEO. W. TRYON, JR.

Subfamily JOUANNETINÆ, Tryon, 1862.

DIPLOTHYRA, Tyron.

Shell with a double accessory valve; the principal plate placed directly over the umbones, with a smaller anterior one adjoining.

This genus is allied to Martesia; but differs in the double or divided dorsal valve.

D. Smithii, Tryon.

Testâ brevi, ovatâ, in medio obliquè divisâ, anticè acutè striatâ, posticè paulo striatâ vel lævigatâ; laminâ umbonali ovatâ, posticè subtruncatâ, anticè rotundatâ, laminâ anteriori parvâ, anticè subacuminatâ.

Shell short, ovate, divided in the middle by an oblique impressed line, posterior to which the surface is covered with growth lines only, but anteriorly it is finely and sharply transversely sculptured, and obsoletely radiately ribbed in some specimens.

The umbonal plates are generally much distorted, so that no particular form can be traced throughout all the specimens, though the more perfect approach to that depicted in the magnified figure above.

Length ·6; height and breadth ·4 inch.

Collections of Acad. Nat. Sci., Smithsonian Institution, Sanderson Smith, New York; Hugh Cumming, London; Geo. W. Tryon, Jr.

Habitat.—Tottenville, Staten Island, burrowing in oyster shells.

Mr. Smith, to whom I am indebted for the opportunity of examining numerous individuals of this curious species, gives the following interesting information in relation to them:

"The shells were all dead, and I have found as yet no positive evidence of the oysters being imported ones, although from the great number of southern oysters planted in Prince's Bay and the neighborhood, there is a considerable probability of this. The large number of oyster shells which have been bored from the inside, and consequently after the death of the oyster, suffices to show that the shell is now, or very recently has been living here, as it is hardly likely that so many large dead shells would have been accidentally

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* Gray, Zool. Proc. part 25.

brought with the living ones. I have hitherto found them only in one lot of thirty or forty loads of shells, of which I cannot ascertain the exact source. They are by no means scarce, and several hundred specimens must have been obtained by myself and others."

From the condition of the dried animal matter contained in some of the specimens, I quite agree with Mr. Smith's conjecture that the species is probably still living at the locality mentioned. In many cases where this species has bored from the outside of the oyster shell, penetrating entirely through its ordinary surface, the oyster has protected itself from contact by depositing a layer of nacre between itself and the exposed portion of the intruder.

DACTYLINA (GITOCENTRUM) Chiloensis, King.

To the synonymy of this species must be added *Pholas* (DACTYLINA) *retifer*. Mörch. Mal. Blätt. vii. p. 177, Dec. 1860.

Description.—T. elongato-cylindracea fere clausa, antice rotundato subproducta, postice elongata planata læviuscula; costæ 25 parum prominentes longitudinalibus validioribus decussatæ, intersectionibus squamiferis; costæ subæquales, quarta antica parvula; interstitia costarum lirulis planis 4–5; costæ anticæ et lirulæ intermediæ validiores, fascie interna excavatæ; lamina dorsalis reflexa unde late umbilicata; cellulæ dorsales ad num. 12 inæquales.

Long 104, alt. 33 mill. Realejo, valva solitaria dextra fractra."

The intermediate flat ribs or lirulæ mentioned above and considered by Mörch to be a distinctive character, are very apparent at the anterior end of most perfect and fresh valves of Chiloensis, and they are frequently marked internally by corresponding sulcæ; as the shell grows to maturity these riblets become obsolete, or are replaced by a single intermediate squamiferus small rib.

There is no regularity in the number of radiating costæ on the surface, though they *do* generally average twenty-five in number; but in some valves they become evanescent posteriorly sooner than in others. The dorsal cellules number in different specimens before me from 12 to 15.

It will be seen that Mörch describes his species from a single valve, and in the course of his remarks upon its distinctive characters, he refers to the figures of Chiloensis in Philippi Abbild. The examination of a few *specimens* would have satisfied him of the entire identity of his shell with Chiloensis.